

The Dock and Harbour Authority

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Editorial

A Year of Progress on the Tyne.

At the annual meeting of the Tyne Improvement Commission, Sir Arthur Sutherland was re-elected chairman. In expressing his appreciation of the compliment thus paid to him, Sir Arthur said twelve months ago he predicted that trade was on the mend and that 1936 would be a better year for industry and commerce. He was glad to think there had been considerable recovery, and that they might expect greater improvement in 1937. The appearance of the river was brighter than for years. "Our duty is to provide the facilities and we are doing it," he said. "I feel that the day is not far distant when many of the now vacant riverside sites will be occupied by thriving industries." He then referred to what had been accomplished during the past year; the erection of Jarrow staiths, the arrangements for the sale of Tyne Dock, the clearing and levelling of riverside sites, preparation for the erection of a new plywood factory, and other works. At the moment there were building on the Tyne 34 vessels of over 200,000 gross tons against 17 vessels with a gross tonnage of 80,000 tons in 1934. Continuing Sir Arthur Sutherland said: "we are pleased to welcome ships of all nations to our port and hope there will be a continued increase in the International exchange of trade. We occasionally hear laments that so many foreign ships use our ports, but I am afraid that there is a lot of ignorance regarding the matter. It may interest you to know that in 1913 the percentage of tonnage using the Tyne was 62 per cent. British and 38 per cent. foreign. In 1934 and 1935 the percentage was the same, but this year up to the end of October, the British tonnage has increased to 63 per cent. and foreign declined to 37 per cent.

In conclusion, I would confidently say that the trade barometer for 1937 is 'set fair.' I hope the forecast will prove true."

Mr. Jenkin Jones, divisional general manager of the North-Eastern area of the London and North Eastern Railway, was co-opted a member by the due-payers in place of Mr. T. Hornsby, who has resigned.

Trade Improvements at the Port of Goole, Yorkshire.

A steady improvement in the trade of the port, despite a falling off in coal, was reported at the annual meeting of the Goole (Yorkshire) Chamber of Commerce and Shipping. Mr. Arthur Townsend, who presided, said that although there had been decreases in certain traffics increases in other directions more than counterbalanced the deficit. In the first ten months of the year shipments of coal, foreign and coastwise, including bunkers, amounted to 1,447,820 tons, a decline of 28,854 tons, equal to two per cent. For the full year, 1935, the total was 1,631,320 tons, and there was every probability of the port making up the decrease of two per cent. Exports to foreign ports totalled 541,779 tons, as against 603,702 tons, a decline of nearly 68,000 tons. General imports and merchandise handled at the docks showed good increases, and the number of ships and net tonnage entering the port were both larger than in 1935. Shipbuilding had been good, ten vessels, mainly of the small coaster type, had been launched at Goole, while the flour milling, chemical and other industries also reported satisfactory progress.

Alderman Kettlewell spoke of the lack of facilities for handling import cargoes at Goole, and he suggested that the matter

should be brought to the notice of the Aire and Calder Navigation and the Railway Company. There was only one free berth with cranes, and when traffic was above normal ships were kept waiting to discharge. The time had long been ripe for the removal of the sheds from the south side of the West Dock and the provision of facilities similar to those on the north side of the dock.

The President said that no doubt the publicity given to the matter would have the desired effect. The report stated that the new entrance lock at Goole is now reaching the final stages of construction, and is expected to be completed early next summer.

Successful Year at Southampton Docks.

The year 1936 will go down in the history of Southampton Docks as one of the most successful in the port's long history.

Although the final statistics, which tell how the tide of trade has ebbed and flowed during the year, will not be available until the middle of January, it is possible to make a reasonably accurate estimate of the port's headway.

Passenger, cargo, the number of ships using the port, their aggregate tonnage—these headings each show increases, and there is reason to believe that this improvement is not merely temporary. Nor only is the general improvement in world trade reflected in figures, but the extension of the docks and the facilities provided there are bound to have an increasing effect in the future.

The number of ships entering the port during the year is estimated at 3,450, compared with 3,114 in 1935. Outward-bound vessels number the same figure, compared with 3,108 in 1935.

The gross tonnage of inward-bound ships will record an increase, it is estimated, from 17,991,539 tons to 18,250,000 tons, and of outward-bound ships from 18,034,388 tons to 18,200,000 tons. There will be a small increase in net tonnage, from 9,738,323 tons to 9,800,000 tons inward and from 9,749,092 tons to 9,750,000 tons outward.

The cargo figures show that the port is continuing to make steady progress in this direction. Inward cargo figures will show an increase from 648,443 tons to about 700,000 tons, and outward cargo from 399,560 tons to about 410,000 tons.

The improvement in the Atlantic trade accounts to a considerable degree for the increase in the passenger figures, although many other routes have also been busier than for many years. Inward-bound passengers are estimated to total 270,000 for the year, compared with 260,547 in 1935, and outward bound 285,000, as against 276,808.

There has also been a large increase in the quantity of mails carried.

Southport Improvements.

Southport Corporation proposes to spend £32,744 on pier improvements.

The scheme provides for the demolition of the pier seaward of the old pier head; general repairs to the structure of the pier from the shore in accordance with the advice of the consulting engineers, Messrs. C. S. Allott & Son; re-decking the full length of the pier, excluding a short length near the shore; replacing hand railing of the pier, where necessary (total estimated cost of the foregoing £8,305). Other works make up the total to £32,744.

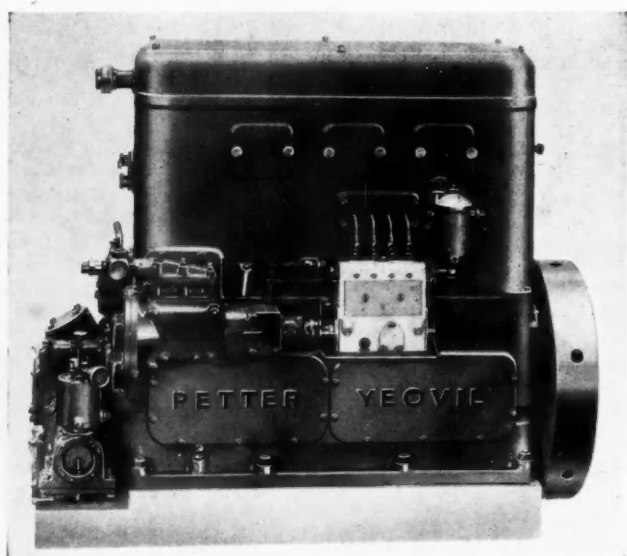
The Petter Harmonic Induction Engine

A Two-cycle Stationary Diesel Unit of Novel Design

SIMPLICITY is such an important factor in the handling and maintenance of oil engines that two-cycle machinery of this type has always offered a strong appeal by reason of the comparatively small number of working parts.

Various methods are adopted with different degrees of success in the endeavour to improve scavenging and otherwise effect an increase in efficiency.

Petters Ltd. of Yeovil have long been associated with the construction of two-stroke engines and their unwavering adherence to this class of power unit has lead them to undertake a vast amount of experimental work. This has resulted in an entirely new type of Diesel motor which is termed by the makers the Harmonic Induction Engine.



A Four-cylinder 64 h.p. Petter Harmonic Induction Engine.

Last month demonstrations were held in London when we had the opportunity for inspecting a number of these motors in operation together with the various components and which were provided in order to give a better understanding of the principles upon which the design has been based.

The power rating is 16 h.p. per cylinder at a speed of 1000 r.p.m., the bore being $4\frac{1}{2}$ ins. and the stroke $6\frac{1}{2}$ ins.

The top of the cylinder head is almost entirely occupied by the single exhaust valve which is operated through the medium of a rocker arm and push rod, the camshaft being gear driven from the crankshaft. The sudden exit of the exhaust gases sets up a wave motion in the outlet pipe and immediately following the inevitable rise of pressure in the pipe line, there is a partial vacuum which is transferred through the exhaust port and to the cylinder. When this condition comes about the piston is nearing the bottom of the cylinder and thus discloses a series of ports having tangential vanes.

The rarefied conditions in the cylinder induce a full volume of pure air. By this time the exhaust valve has closed and the rising piston completes the cycle of operation.

A vital factor in the efficient working of the engine is the length of the primary exhaust pipe which connects the engine with an expansion chamber which may be installed wherever it is most convenient. Actually no further exhaust pipe is needed as effective silencing is already achieved, but if it is necessary to have a further length of piping, owing to the requirements of specific installations, the length of this does not affect the operation of the engine and although so great a length as 90-ft. would hardly seem advisable, we understand that during the course of experiments a final outlet of this length was fitted without affecting the running of the engine.

A C.A.V.-Bosch pump is used in conjunction with an injection nozzle having a single hole, the result of which is freedom from potential trouble by reason of carbon deposit.

A point of considerable importance is that the wave motion in the primary exhaust pipe only functions above a certain engine speed and on the single cylinder model, which it may be added is in full production, scavenging is by means of the

compression in the crankcase during the few seconds occupied by the engine to reach a speed of approximately 600 r.p.m. Above this speed harmonic induction commences and there is no need to resort further to crankcase scavenging.

It must not be thought for a moment that the method of induction reduces flexibility, for once the engine is running above the speed indicated, the requirements of the induction system are by no means so arbitrary as might be imagined.

The general design is extremely neat, each cylinder head being separate and detachable, whilst the valve gear is enclosed by a quickly removable cover plate.

Aluminium alloy pistons are fitted, whilst there is a bearing at each side of every crank throw. White metal bearings are used for both the crankshaft and connecting rod big ends.

The lubricating system is by pressure throughout, the whole of the oil being carried in the sump, from which it is drawn by a gear pump and fed to the main bearings, big ends, camshaft and rocker bearings. Internal oil connections are fitted throughout with a single exception, for a connecting pipe is provided as a feed to an oil cooler for engines in service in tropical countries. With running conditions such as pertain in Great Britain and in other places having a temperate climate, no oil cooler is deemed necessary.

The lubricating system embodies the usual filter together with a pressure relief valve. A gauge indicates the functioning of the oil circuit.

The single cylinder model can be started quite easily by hand, a decompressing device being provided for this purpose. In the case of the large units, however, air starting is provided.

In these days when oil engine manufacturers seem hesitant to depart from certain well tried lines, Petters Ltd. are to be congratulated upon so efficiently opening up the practical possibilities of harmonic induction, moreover their achievement is all the more creditable as this new series of Diesel engines in no way sacrifice the simplicity of the two-cycle type.

The Port of Amsterdam

The position of the Port of Amsterdam in regard to number of vessels and tonnage and to goods traffic arrived and sailed, as compared with the corresponding figures of last year, is as follows:—

SEAGOING VESSELS AND TONNAGE.

	ARRIVALS				SAILINGS			
	No.	Per Cent.	N.R.T.	Per Cent.	No.	Per Cent.	N.R.T.	Per Cent.
Nov. 1935	254		350,845		255		333,230	
" 1936	256		364,620		236		321,611	
	+2	+0.79	+13,775	+3.93	-19	-7.45	-11,619	-3.49
Oct. 1936	262		367,006		270		363,254	
Nov. 1936	256		364,620		236		321,611	
	-6	-2.29	-2,386	-0.65	-34	-12.59	-41,643	-11.46
Jan.-Nov. 1935	2,649		3,835,597		2,673		3,891,213	
1936	2,744		3,887,676		2,751		3,977,181	
	+95	+3.59	+52,079	+1.36	+78	+2.92	+86,968	+2.25

SEAGOING GOODS TRAFFIC. (In Tons of 1000 Kilos*).

	1 Import		2 Transit incl. in col. 1		3 Export		4 Transit incl. in col. 3		5 Total col. 1 & 3	
Oct. 1935	299,800	55,638	172,814	71,955	472,614					
" 1936	248,918	85,601	192,703	86,107	441,621					
	-50,882	+29,963	+19,889	+14,152	-30,993					
	-16.97%	+53.85%	+11.51%	+19.66%	-6.56%					
Sept. 1936	274,129	67,122	169,943	61,106	444,072					
Oct. 1936	248,918	85,601	192,703	86,107	441,621					
	-25,211	+18,479	+22,760	+25,001	-2,451					
	-9.20%	+27.53%	+13.39%	+40.91%	-0.55%					
Jan.-Oct. 1935	2,641,265	577,376	1,442,528	626,615	4,083,793					
" 1936	2,542,698	625,904	1,521,273	674,523	4,063,971					
	-98,567	+48,618	+78,745	+47,908	-19,822					
	-3.73%	+8.42%	+5.46%	+7.65%	-0.49%					

* These figures have been taken from the monthly statistics of the Central Bureau, The Hague, Holland.

The Port of Colombo

Liquid Fuel Imports.

The quantity of liquid fuel imported at Colombo during September, 1936, amounted to 30,383 tons, as compared with 33,804 tons in September, 1935. For the first nine months of 1936, 222,348 tons of liquid fuel were imported, as compared with 236,556 tons in the corresponding period of 1935.

Liquid Fuel Bunkers supplied to Steamers.

Liquid fuel bunkers supplied to steamers in September, 1936, was 39 ships bunkered with 19,871 tons of liquid fuel, as compared with 41 ships with 26,600 tons in September, 1935. During the first nine months of 1936, 392 ships were bunkered with 191,611 tons of liquid fuel, as compared with 374 ships with 201,301 tons in the corresponding period of 1935.

Coal Imports.

The quantity of coal imported during the month of September, 1936, was 18,216 tons, as compared with 53,606 tons in September, 1935. Altogether, 315,430 tons of coal were imported during the first nine months of 1936, as compared with 333,072 tons in the corresponding period of 1935.

Coal Bunkers supplied to Steamers.

The number of steamers bunkered during September, 1936, was 58 with a total of 15,046 tons of coal, as compared with 79 steamers with 21,713 tons in September, 1935. During the first nine months of 1936, 591 steamers were bunkered with 169,291 tons of coal, as compared with 635 steamers with 180,849 tons in the corresponding period of 1935.

Number and Tonnage of Vessels Entered and Cleared.

The number and tonnage of vessels other than country craft engaged in trade, which entered and cleared at the Port of Colombo during September, 1936, and the first nine months of this year, with comparisons for 1935 and 1934, is as follows:

	Vessels engaged in Foreign Trade		Vessels engaged in Coasting Trade	
	No.	Tons	No.	Tons
(a) Entered during September, 1936	193	904,764	9	20,124
" " " 1935	214	1,002,405	11	31,201
" " " 1934	213	970,473	4	13,431
During the nine months ended September, 1936 ...	1,933	9,012,824	48	107,820
During the nine months ended September, 1935 ...	1,986	9,105,868	51	140,759
During the nine months ended September, 1934 ...	1,965	8,975,436	34	102,862
(b) Cleared during September, 1936	193	893,640	2	7,281
" " " 1935	227	1,029,584	2	4,530
" " " 1934	216	986,291	3	7,435
During the nine months ended September, 1936 ...	1,954	9,148,466	25	79,124
During the nine months ended September, 1935 ...	2,023	9,188,901	18	51,733
During the nine months ended September, 1934 ...	1,979	9,017,965	26	88,180

Tonnage of Imports and Exports.

The tonnage of imports and exports at the Port of Colombo during September, 1936, and the first nine months of this year, together with comparisons for 1935 and 1934, is as follows:—

	During September		
	1934 Tons	1935 Tons	1936 Tons
Imports (excluding Coal and Oil) ...	78,766	86,539	94,737
Exports (" " ") ...	60,635	47,928	51,434
Total ...	139,401	134,467	146,171
	During the nine months ended September		
	1934 Tons	1935 Tons	1936 Tons
Imports (excluding Coal and Oil) ...	764,499	761,637	800,391
Exports (" " ") ...	563,461	426,592	407,920
Total ...	1,327,960	1,188,229	1,208,311

Oil Facilities Receipts.

The oil facilities receipts for September, 1936, were Rs.74,701, as compared with Rs.109,083 in September, 1935. The total receipts for the first nine months of 1936 were Rs.732,373, as compared with Rs.826,064 in the corresponding period of 1935.

The Port of Ghent.

During the month of November, 1936, 171 ships of 182,451 n.r.t. entered the Port of Ghent, as compared with 155 ships of 203,460 n.r.t. in the corresponding month of 1935. This is an increase of 16 ships, but a decrease of 21,009 n.r.t.

For the eleven months ending November, 1936, 1,885 vessels of 1,984,304 n.r.t. entered the port, as compared with 1,606 vessels of 1,757,889 n.r.t. in the corresponding period of 1935. This is an increase of 285 vessels and 226,415 n.r.t.

The Port of Bristol Authority

Alderman Dyer, the Chairman of the Port Authority, celebrated his 80th birthday on the 12th December, and on 16th December a complimentary dinner and presentation was made to him at the Grand Hotel, Bristol, in the presence of over 200 persons representing every phase of city life. Mr. H. Reginald Wansbrough presided over a company which included the Lord Mayor of Bristol, the Sheriff, and the Master of the Society of Merchant Venturers—Lieut.-Colonel Dan Burges, V.C., D.S.O. Mr. Wansbrough proposed the toast of "Our Guest," and referred to the fact that they were present to do honour to an old friend and fellow-citizen and a man who had done much for the City without fee or reward.

In making the presentation to Alderman Dyer, the Chairman said:

"Your fellow-citizens, with many thanks, deep affection and much gratitude to you for all you have done, desire me to hand you this silver salver, inscribed: 'Presented, together with cheque to Alderman Edward M. Dyer, O.B.E., J.P., chairman of the Port of Bristol Authority, by his fellow-citizens on the occasion of his 80th birthday as a mark of their keen appreciation of the able, untiring and successful services rendered by him to the city and Port of Bristol throughout his 34 years' membership of the City Council and the Port Authority.'

"At the same time I have to present a cheque, which I have signed myself, for 2,000 guineas, and in order that you may know and recognise how many friends have contributed to that cheque, I am going to present you with an album which Captain Mardon, with extreme generosity and kindness, has had prepared.

"It is very ornate and done in the most excellent way by those whom Captain Mardon has had the power to call in for the purpose of preparing it. On the face of it is a picture of the Royal Edward Dock, beautifully done, and on the following page are the words:— 'This book contains the names of those citizens of Bristol who have subscribed to the presentation to Alderman Edward M. Dyer, O.B.E., J.P., chairman of the Port of Bristol Authority of an inscribed silver salver, and cheque in recognition of his great services to the city and Port of Bristol during the past 34 years.'

Alderman Dyer, through illness, was not able to make more than a short reply, but the Town Clerk of Bristol read the speech which Alderman Dyer had prepared.

"I well remember my first attendance in the Board Room of the Docks Committee in Queen Square when I joined the Port Authority in 1903. Of all the members at that meeting there is only one now left in the business of the port, Mr. Joseph Holman, who, I am very glad to see, is here to-night.

"In those days the Committee consisted of 19 members, but it came to be realised more and more that the Docks were a business concern and had to be managed as such; in fact, the Committee corresponds to a Board of Directors, and in 1912 the Council reduced the Committee to its present number of eleven.

"So far as the staff is concerned, there is only one officer left, namely, Mr. Jones, the General Manager, who was on the staff when I joined the Port Authority. In those days, I am afraid, the conditions of the pay of the staff were somewhat haphazard, but now a grading scheme has been introduced, superannuation has become operative, and all the conditions revised for the good not only of the staff but of the Authority.

"I have seen some troublesome times since I have been a member of the Port Authority, but I am satisfied that to-day I have, as Chairman, the full confidence of the Committee. At the time I joined the Authority the question of dock extension was very much to the fore. There were the respective advocates for the developments at Avonmouth, developments at Portishead and the dockisation of the River. A good deal of time had been lost in previous years in the endeavour to reconcile conflicting views as to what would be the best scheme to adopt for the Port, and it had been decided just before I joined the Committee to proceed with the Royal Edward Dock which was, as you know, opened in 1908. Shortly after it was opened it was found necessary to equip more berths with sheds, cranes and other facilities, as well as to provide more specialised appliances for the handling of various commodities.

"The trade continued to develop, and we found it necessary to proceed with an extension of the dock which you know as the Eastern Arm. Sheds were provided and granaries with additional elevators and bands for handling the grain, together with a large amount of storage accommodation.

"At that time there were many pessimists who predicted that we were too far ahead of requirements and that the extension would be a 'white elephant,' but time has shown, and the time has been very short, that we were fully justified in taking the work in hand, as we have frequently been taxed to the utmost in finding accommodation for the various classes of goods requiring to be dealt with.

"The old Avonmouth Dock has entirely changed its face, for you will now see that practically the whole of the dock is used for dealing with products for the manufacture of flour and of feeding stuffs for animals. There have been very large developments in the establishment of new mills at the dock, and a further mill is now in course of erection.

"It must not be overlooked that at the Avonmouth Dock we have the important and valued trade in bananas, which was established first of all at Avonmouth at the inception of the West India Line, and which has now been largely developed by Messrs. Elders and Fyfes.

"I do not want to bore you with a lot of figures, but it is interesting to note, as indicative of the growth of trades, that whereas in 1903 the grain trade imported 663,000 tons, last year the imports were over a million tons. The importation of feeding stuffs is a very important development, and has increased from 10,000 tons in 1903 to 143,000 last year. The banana traffic amounted to just a little over 600,000 bunches in 1903 and to six million bunches last year. The oil trade, of which there has been a very substantial development and in respect of which a large area of land has been taken by the various companies for their respective trades, has grown from 63,000 tons in 1903 to 750,000 tons in 1936.

"I could go on for a long while dealing with various classes of goods and trades, but the figures I have mentioned will show generally the trend of things, although perhaps I ought to mention that the total weight of goods passing through the Port was 3,000,000 tons in 1903 and 4,300,000 tons last year."

Mersey Dock Engineer's Report

MR. T. L. NORFOLK, engineer to the Mersey Docks and Harbour Board, has issued his annual report in which he makes a review of the works undertaken on the Liverpool and Birkenhead sides of the River Mersey, under the headings of repairs and maintenance, conservancy, dredging, dredgers, hoppers, etc.

It is stated no work has been carried out in connection with the steel jetties at the Brunswick Dock river entrance during the year.

At Gladstone Graving Dock, four 30-cwt. electric cranes on the north side of the dock have been reconditioned. Two of the cranes are to be converted to portal type cranes and installed on the quayside of the shed, north side, Gladstone Dock.

Work on the removal of old sills, etc., on the west side of the passage between Hornby Dock and Alexandra Dock is in hand, but progress has been retarded so as to prevent the work interfering with the working of the passage.

Reference is made to the damage to the inner gates of the 80-ft. river entrance lock of Brunswick Dock, a little over a year ago. It may be remembered the gates collapsed. An inquiry was made as to the cause, and it was ascertained that the gates had been left partly open and when certain sluices were lifted in error, the water running out of the lock brought the gates together improperly mitred, and as the water ran down in the lock, the gates were subjected to abnormal loading which caused them to collapse.

A caisson was placed across the entrance and steps were immediately taken to remove the broken gates. An examination of the floor and sill was made, but no defects or damage were revealed, and the lock was then cleared of small wreckage and again placed in commission, the caisson being retained and removed to accommodate the traffic on certain tides. The damaged gates were placed in the Queen's Graving Dock for thorough examination, when it was revealed that they were beyond repair, and the work of constructing a new pair was immediately put in hand. Every effort is being made to complete the gates as early as possible, but difficulty has been experienced in obtaining suitable greenheart timber. One gate, however, is now approaching completion, and good progress has been made on the other.

The whole of section No. 1 and part of section No. 2 of the shed at the north end of Brunswick Dock, east side, has been let on lease to the Liverpool Grain Storage and Transit Company, for the storage of grain and breadstuffs. The eastern half of the sections leased to the Company has been demolished, and a concrete grain silo is being constructed on the site by contractors on behalf of the Company. The work is well advanced. The old traffic office at the north end of the shed, which had been empty for a number of years, has been demolished in the course of the work.

Summaries are given of the repairs and maintenance work carried out at Alexandra Dock and branches, Carriers Dock, Canada Dock, Huskisson Dock, Sandon Half-tide Dock, Prince's Dock, Liverpool Landing Stage, Duke's Dock, King's Dock, Queen's Dock and Herculaneum Dock.

Concerning the work on the Birkenhead side of the river, it is stated it has not been possible to complete the whole of the railway connection between the north side of the West Float and the Bidston Dock, pending a decision regarding the roadway leading to the Poulton Bridge. A temporary line had, however, been laid so that tenants could use the berth. Five 5-ton steam cranes have been placed on the north quay for use in connection with the discharge of vessels arriving with cargoes of pit props, etc., for the tenants.

A five-ton steam crane, together with a Priestman's grab, has been placed on the north quay of Egerton Dock for use in connection with a tar macadam plant, which is being erected by the tenants.

Conservancy

Taylor's Bank Revetment is being raised, the programme of work being to elevate this five feet above bay datum. During the year, 26,364 tons of stone have been deposited, making the total since the commencement of the work 240,362 tons.

CROSBY EAST TRAINING BANK is standing well, and has required no stone depositing during the year, the total amount of stone deposited since the commencement being 769,594 tons.

PORTIONS OF CROSBY WEST TRAINING BANK show signs of settling and sinkage, and have needed attention. Constant observation is being kept, and the weak places attended to immediately, a total of 18,644 tons of stone being deposited during the year for that purpose. The total amount

of material deposited since the commencement of the work is: Clay, 1,346,151 tons; stone, 1,717,266 tons.

ASKEW SPIT TRAINING BANK was completed to its authorised height of 5 ft. above bay datum over the authorised length of approximately 10,140 ft., but considerable sinkage and settling over the entire length of the bank is taking place, and it is evident that much rebuilding will be necessary before stability is assured. The following quantities of stone have been deposited:—Total for the year, 100,388 tons; total since the commencement of the work, 671,754 tons.

The first section of the Queen's North Training Bank is standing well and, apart from a few gaps which developed, has needed little attention. The following quantities of stone have been deposited:—Total for the year, 9,512 tons; total since the commencement of the work, 349,642 tons. A start has been made on the second section, and approximately 1,150 ft. have been completed to the finished level. The total quantity of stone deposited on this section during the year amounted to 125,302 tons.

As regards the Queen's South Training Bank, approximately 2,000 ft. have been completed to the finished level, necessitating 120,015 tons of stone. The total amount of stone deposited on the various training banks during the year was 400,225 tons.

In connection with the construction of the training banks on the northern side of the Channel, it has been decided to remove by dredging the portion of Taylor's Spit which extends over the new projected alignment of the Queen's North Training Bank.

Dredging

The total quantities of sand removed from the Bar, Queen's (including Taylor's Spit) and Crosby Channels during the year were as follows:—

	Bar Tons	Taylor's Spit Tons	Queen's Channel Other Sites Tons	Crosby Channel Tons	Total Tons
"Leviathan" ...	17,600	8,170,000	—	105,200	8,292,800
"Hoyle" ...	3,010	3,135,600	1,023,930	1,087,800	5,250,340
"Hilbre Island" ...	—	908,250	1,389,990	2,314,060	4,612,300
"Coronation" ...	3,500	581,280	547,960	605,010	1,737,750
"Burbo" ...	28,420	1,340,080	905,220	551,600	2,825,320
Totals ...	52,530	14,135,210	3,867,100	4,663,670	22,718,510

The quantity of sand removed from the Bar since the commencement of dredging in 1890 is 104,951,880 tons, and from the shoals in Queen's and Crosby Channels 415,167,170 tons, making a total of 520,119,050 tons.

The sand pump dredgers have also worked part of their time at the Brunswick River entrances, South Dingle Jetty and Garston Channel. The "Coronation" also removed a quantity of sand from the shoals off New Brighton. The total quantity of sand so removed from these positions during the year was 3,243,160 tons. In addition, bucket ladder dredgers worked at the Brunswick River entrances during the year, and removed 690,171 tons of sand. Two new 1,100 tons twin-screw hopper grab dredgers have been ordered from William Simons & Co., Ltd., and are due for delivery in March, 1937. The vessels are to replace two of the older grab dredgers.

The Port of Karachi.

In the month of September, 1936, 74 vessels with a net registered tonnage of 189,733 entered the Port of Karachi, and 75 vessels cleared of 198,982 n.r.t. The number of vessels which entered and cleared during September, 1935, were:—Entered, 66 vessels of 168,230 n.r.t., and cleared, 74 vessels of 192,807 n.r.t.

For the six months, April-September, 1936, the number of vessels entering the Port of Karachi amounted to 435 of 1,129,853 n.r.t., and cleared, 437 vessels of 1,138,823 n.r.t. During the corresponding period of 1935, 432 vessels of 1,136,736 n.r.t. entered, and 433 vessels of 1,147,084 n.r.t. cleared. The above figures do not include country craft.

The amount of cargo handled in September, 1936, was:—Imports 57,042 tons, and exports 96,549 tons, a total of 153,591 tons of cargo. In September 1935, imports amounted to 64,596 tons, and exports 77,906 tons, a total of 142,502 tons of cargo. For the six months, April-September, 1936, imports amounted to 371,509 tons, and exports 501,420 tons, a total of 872,929 tons. During the corresponding period of 1935, imports were 357,720 tons, and exports 466,181 tons, a total of 823,901 tons.

Hull and the East Coast

Suggested Dock Extensions at Hull.

THE question of improved and extended dock accommodation and facilities at Hull has been under consideration by the Shipping Committee of the Hull Chamber of Commerce and Shipping, and suggestions to this end have been submitted to the London and North-Eastern Railway Company, the owners of the Dock Estate. So concerned was the Committee with the needs of the port that a special Committee was appointed to study its requirements, and after the most careful consideration various recommendations were drawn up for submission to the Directors of the London and North-Eastern. With regard to the "town docks" the Committee suggested that the Victoria Dock and Mytongate locks, now obsolete, should be brought up to present-day requirements, and that the approaches to these docks should be improved and the quay-sides and shed floors made smooth and sheds all be closed in. They also asked that there should be provided 3-ton movable or overhead electric cranes and one or two 5-ton cranes, and at Prince's Dock the lifting power increased to ten tons or new cranes provided. To bring Albert Dock up to date the Committee suggested that coal conveyors could be erected on the north side between the warehouses and the old-fashioned hoists on the south side cleared away to make room for the erection of goods warehouses, similar to the new 29 warehouses at William Wright Dock, to accommodate the near-Continent trades displaced from the Town Docks. The Committee also asked for the completion of the Riverside Quay adjoining, by extending it the further 2,500 ft. authorised. The proposals for the Victoria Dock, the home of the import timber trade, included four additional bogie berths, a fresh lay-out of merchants' yards, extended standage room and more timber bogies. The existing facilities, cranes, etc., at the Alexandra Dock, it was suggested, should be brought up to date; and, most important of all, that the south-west "arm" of King George Dock provided for in the original plans should be proceeded with immediately but on a bigger basis, and completed with sheds and cranes for liners. These recommendations were submitted to the Company, whose view, according to the report of the Shipping Committee, was that they had already undertaken heavy commitments in furtherance of their desire to give the most up-to-date facilities to the trading interests at Hull, and they were not, at the moment, in a position to undertake further obligations involving substantial capital expenditure. Keen dissatisfaction was expressed, and joint meetings followed, in the course of which the Company invited the shipping interests to submit in order of priority the proposed port improvements of most importance. The Shipping Committee was convinced that additional water space to accommodate the increasing average size of vessels was of paramount importance if the needs of the port were to be satisfied, which, having regard to the existing layout of the dock system, could only mean the completion of the south-west "arm" of King George Dock. Taking into consideration the limited financial resources of the L.N.E.R. Company, the following order of priority was suggested:—1, Victoria Dock; 2, Albert Dock; 3, Town Docks; 4, Alexandra Dock; 5, the Riverside Quay. At the same time, the view was strongly held that the minimum requirements of the port would never be satisfied until all the items previously enumerated had been covered. The opinion was also expressed that a railway company can never make a satisfactory port authority. "It certainly seems doubtful," concludes the report, "whether Hull could accommodate another regular steamship service, were it offered, under existing conditions, and the position in the sawn wood and pit-wood trades especially is not encouraging to further traffic."

Improvements at Victoria Dock, Hull.

With regard to the outstanding question of improved facilities at Victoria Dock, Hull, to meet the wishes of the timber trade, and in pursuance of which the L.N.E.R. Company have prepared a scheme to cost approximately £150,000, the outcome of the discussions between the timber interests and the Railway Company has proved eminently satisfactory. At the December meeting of the Hull Chamber of Commerce and Shipping, Mr. J. B. Stringer, who is prominently identified with the timber trade, reported that agreement had been arrived at for the Company to provide extra bogie berths on the north side of Victoria Dock, also extra bogies and more storage accommodation. Mr. Stringer added that the details were not quite complete, but all parties were more or less in agreement, and that the minor details to be settled would not interfere with the work going ahead. Originally, the L.N.E.R. sought to make it a condition of the improvements being undertaken that the importers who lease yards from the Company

should enter into an agreed scheme to confine a greater portion of the traffic for inland destinations to rail transport, and referring to this, Mr. Stringer said that he could assure the road transport people that they would have full access to the dock; no bargain to the contrary had been entered into.

The shipping and timber interests at Hull are gratified to learn that the Railway Company have intimated their intention to make a start on the alterations almost immediately. The carrying out of the scheme, it is hoped, will give considerable relief to the pressure and delays during the busy part of the season and induce the Baltic Maritime Conference to lift the extra freight rates charged on vessels carrying timber to the Victoria Dock. Although imports of sawn wood have been heavier, the average delay to timber vessels has probably been less in the past season than in previous years; yet delays up to seven days have, it is stated, been incurred by individual vessels before a discharging berth was available, besides which facilities generally have had to be rationed during periods of congestion. All this will, it is expected, be altered next season if the present plans are carried into effect in time.

To the end of November the imports of timber (hewn and sawn) at Hull amounted to 1,519,239 loads, compared with 997,022 loads in the corresponding eleven months of 1935, an increase of over 50 per cent., and a "record" for the port.

Annual Meeting of Hull Chamber of Commerce.

At the annual meeting of the Hull Chamber of Commerce and Shipping strong comments were passed on the attitude of the London and North-Eastern Railway directors towards dock requirements at Hull. The substance of the complaints was that while they could find £750,000 to expend on the extension of the St. Andrew's Dock to satisfy the fishing industry, they were unable to do anything for the general shipping trade of the port. "The trade of the country," said Mr. Minnitt Good, "has taken an upward turn, and Hull is not ready or able to deal with increased traffic."

Major W. H. Carver, M.P., a director of the Company, who was present, replied that the L.N.E.R. was spending vast sums of money up and down the country, and that as Hull was having nearly a million pounds spent on it, it could be taken that the port was having its share. Three quarters of a million was being spent on the St. Andrew's Dock extension, and that sum would be brought up to a million pounds when the directors had decided on plans now before them. Something very considerable was contemplated for the benefit of the timber traders who, he believed, would have every cause for satisfaction. Referring to a criticism that a railway company could not manage the docks efficiently, Major Carver said if it was the opinion there should be an independent port authority he would welcome it, but he doubted if it would be as successful as now, when the docks were attached to the railway.

Humber Bridge Project.

Official intimation has been received by the Parliamentary Committee of the Hull Corporation of the Government's inability at present to offer any financial assistance towards the erection of a road bridge over the Humber between Hull and the North Lincolnshire bank. The Minister of Transport, in his letter, stated that he appreciated the care with which the case for such a bridge had been investigated, and added that the Government had given the closest consideration to the case presented. He enclosed a copy of a statement made in the House of Commons with reference to proposed bridges over the estuaries of the Forth, Severn and Humber which stated that, having regard to the over-riding importance of the National defence programme and the demands which that programme would progressively make upon the National resources, the Government had come to the conclusion that they would not be justified in embarking upon the execution of these public works at the present moment. It was added that this decision does not exclude the re-consideration of these projects at a later date.

The Parliamentary Sub-Committee reported that they felt that, having regard to the terms of the Minister of Transport's letter, no good purpose would be served by pressing the matter just now. They propose, however, if the City Council agrees to carry on the negotiations where they have at the present juncture been compelled to leave off, in the event of it being felt that substantial Government assistance will be forthcoming. With this object they asked for authority to request the Town Clerk from time to time to communicate with the appropriate Government departments and this authority has been granted by the City Council.

Hull and the East Coast—continued

The report also detailed the steps taken to secure the support of adjoining public authorities and to inform the Humber Conservancy Board of the progress made. With regard to the plans for the proposed bridge prepared by Mr. Ralph Freeman of Sir Douglas Fox and Partners, the report pointed out that the Washington Bridge over the River Hudson, with a span of 3,500 feet, was completed in 1932, and that a bridge with a span of 4,200 feet was then being constructed and has since been completed at the Golden Gate at the entrance to San Francisco Bay. The span required for a bridge across the Humber with piers above low waterline would be approximately 4,500 feet, and upon this the Committee concentrated its efforts.

The Humber Conservancy Board and the Aire and Calder Navigation were approached informally at a very early stage, and had financial assistance been forthcoming from the Government further interviews would have taken place with the object, if possible, of removing all opposition from these and other bodies and persons who opposed the last Bill introduced to Parliament.

Appointment.

Following the death of Mr. C. A. Mountifield, the Humber Conservancy Board have appointed Mr. G. H. Parrish, one of the Board's engineering assistants, to be superintendent of the Upper Humber. Mr. E. Booth, assistant superintendent, was, at the same meeting, granted an increase in salary in recognition of the additional responsibility incurred by him during the late superintendent's illness.

Pilotage Dues in the Humber.

According to an official return, the British ships piloted into the Humber last year numbered 4,004 and foreign-owned 8,136, and the pilotage dues amounted to £55,742, including £164 for docking and other fees. The 71 first-class pilots earned on the average £732 gross and £465 net, and eight third-class pilots

£450 gross and £286 net. The balance in the benefit or super-annuation fund at the end of the year was £52,866. At Goole there are 15 licenced pilots, and the amount received was £8,084 (including £1,187 for extra services), the average being £460 gross and £389 net, plus £67 for extra services. The earnings of the four pilots for the River Trent amounted to £1,720, and the average £430 gross and £344 net. Although pilotage in the Humber is described as compulsory, there are exceptions and exemptions provided for under the Pilotage Act, 1913. At the close of the year the pilotage certificates in force for the Humber was 147 and for Goole 46.

Coal Exports from the Humber Ports.

The quantity of coal exported from the Humber ports (Hull, Goole, Grimsby and Immingham) to places abroad in the first eleven months of 1936 was 2,672,023 tons, compared with 3,000,594 tons in the corresponding period of 1935. It therefore seems unlikely, when the final returns for the full year are available, that the total will reach three million tons, as against an average of over three-and-a-quarter million tons exported in the past three or four years. Shipments of coal in ships' bunkers will in all probability also be down, judging from the fact that at Hull, for example, the aggregate shipments, cargo and bunkers, foreign and coastwise, at the beginning of December was 1,927,088 tons, compared with 2,257,200 tons at the same date, 1935—a decline of over 330,000 tons. The total for Grimsby was 1,007,597 tons, as against 1,039,137 tons, and for Immingham 1,576,988, against 1,777,442 tons. The embargo on trade with Italy, the dislocation in connection with Spain and the failure of markets in Central Europe to expand, have been contributory causes of the decline in shipments. Exports to Belgium have fallen to almost vanishing point, consequent upon currency devaluation and a heavy import duty. Trade with France has been upset by unsettled political conditions and the system of licences, but there has been a steady increase in the shipments of coal to Germany, while Scandinavia has also been a good customer.

Aden Port Trust

The following are the returns of shipping using the Port of Aden for the month of October, 1936:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	143	586,070
" " under 200 tons ...	5	486
Government Vessels ...	6	26,237
Dhows ...	97	3,685
PERIM.		
Merchant Vessels over 200 tons ...	—	—

The total value of imports, excluding Government Stores, was Rs.49,94,000/—, as compared with Rs.62,23,000/— for October, 1935, and of exports Rs.30,20,000/—, as compared with Rs.48,17,000/—. The corresponding figures for 1934 were Rs.42,49,000/— and Rs.26,82,000/—.

The total value of both imports and exports together was Rs.80,14,000/—, as compared with Rs.110,40,000/— for the corresponding month last year, and Rs. 69,31,000/— for 1934.

Imports during the month were above those for October,

TRADE OF THE PORT.

Article.	Unit	Imports		Exports	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal ...	Tons	8,205	1,48,492	0	0
Coffee ...	Cwts.	4,805	1,07,508	7,959	2,48,706
Grain, Pulse and Flour ...	"	37,593	2,24,658	28,059	1,55,109
Gums and Resins ...	"	872	16,317	1,715	34,768
Hardware ...	"	0	33,127	0	26,506
Hides, raw ...	No.	4,534	6,405	9,338	20,104
Oil, Fuel ...	Tons	35,916	8,55,598	0	0
" Kerosene ...	Gls.	2,808	1,756	3,216	2,135
" Petrol ...	"	32,280	28,615	1,432	1,430
Salt ...	Tons	0	0	35,825	3,85,600
Seeds ...	Cwts.	11,273	1,02,089	673	6,202
Skins, raw ...	No.	407,498	2,52,554	414,466	4,00,641
Sugar ...	Cwts.	40,950	1,94,557	15,884	76,141
Textiles—					
Piece Goods, Grey ...	Yds.	4,107,366	5,39,365	2,703,390	3,37,533
" " White ...	"	753,214	1,22,034	411,205	65,557
" " Printed or Dyed ...	"	1,600,445	2,91,290	1,463,410	2,96,790
Twist and Yarn ...	Lbs.	88,420	39,165	117,108	43,169
Tobacco, Unmanufactured ...	"	492,828	94,405	415,772	86,502
" Manufactured ...	"	107,100	1,13,416	55,524	82,548
Other Articles ...	No. of Pkges.	76,366	16,07,022	21,326	5,42,680
Treasure, Private ...	—	0	2,15,239	0	2,08,130
Total ...	—	—	49,93,612	—	30,20,251

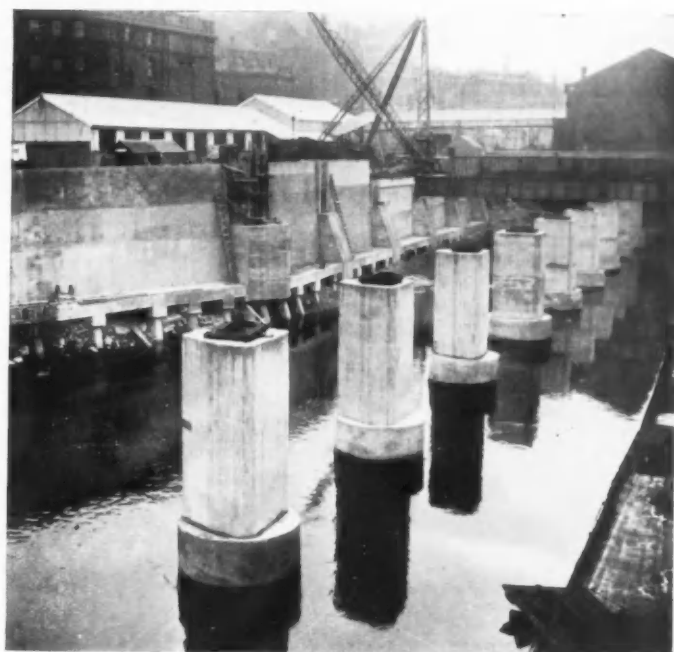
The number of merchant vessels over 200 tons that used the port in October, 1936, was 143, as compared with 154 in the corresponding month last year and 150 in 1934, and the total tonnage was 586,000, as compared with 680,000 in 1935 and 686,000 in 1934.

Excluding coal, salt, fuel oil and Military and Naval Stores and transshipment cargo the total tonnage of imports in the month was 10,000 and of exports 5,600, as compared with 15,000 and 10,900 respectively for the corresponding month last year, and 9,100 and 5,900 for 1934.

1935, in the case of raw hides, seeds, raw skins, sugar, white and printed or dyed piece-goods, and manufactured tobacco; and below, in the case of coffee, grain, pulse and flour, gums and resins, hardware, grey piece-goods, twist and yarn, unmanufactured tobacco and private treasure.

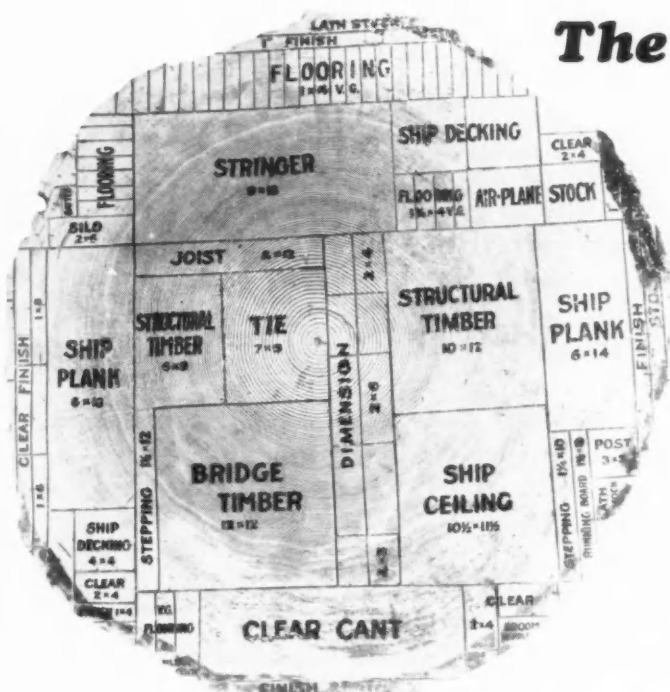
Exports were above those for October, 1935, in the case of manufactured tobacco; and below, in the case of coffee, grain, pulse and flour, gums and resins, hardware, raw hides, seeds, raw skins, sugar, grey, white and printed or dyed piece-goods, twist and yarn, unmanufactured tobacco, and private treasure.

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TWO SHALLOW DRAUGHT SELF-PROPELLED DIESEL-ENGINED HOPPER BARGES, each 220 cubic yards capacity, and arranged for fitting Diesel Grab Dredging Crane, electric lighting, etc. Lloyd's Highest Class.

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Shipping China Clay at Fowey

Facilities provided by the Great Western Railway Company and which have been improved recently

THERE is little doubt that Cornwall is the oldest industrial centre in England; the export of tin to various Mediterranean ports was taking place at least 3,000 years ago.

Tin is still an important product of this south-west corner of Great Britain, but to-day the mining industry, which includes coal, is supplemented by agriculture, fisheries and the production of china clay.

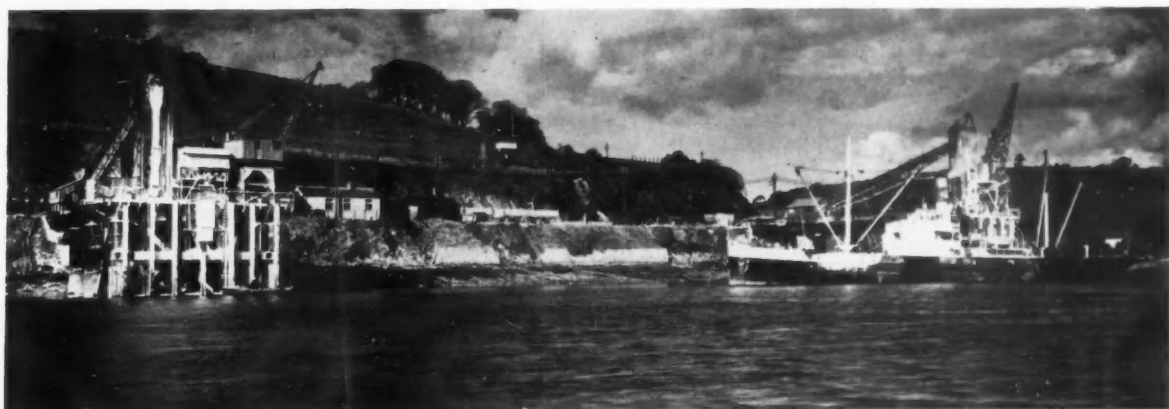
It is roughly 200 years since china clay was discovered, but nowadays it is shipped from Cornwall to every country in the world.

China clay is decomposed granite, but its recovery calls for much labour as it is never found entirely by itself, and in its natural state it is a gritty substance of a plastic nature, containing grains of quartz and other material from which it must be freed.

In order to overcome this difficulty and afford facilities for the quick loading of clay in bulk, the Railway Company provided an electrically-operated belt conveyor with an adjustable tipping shoot, which could be raised or lowered as required, on what is known as No. 4 jetty, which is "T" headed and projects at right angles from the main jetty frontage and is rail-served by turntables.

The capacity of this conveyor was 240 tons per hour, compared with 200/300 tons per day, which represented the maximum capabilities of the appliances in use at the other jetties.

It was in 1909 that No. 4 jetty was first improved, but as shipments steadily increased and vessels having a carrying capacity of up to 10,000 tons were now coming to Fowey, it was clear that still more elaborate loading gear must be provided.



Jetties No. 3 (left) and No. 4 (right) from the river.

In the process of washing and filtering the china clay is carried off by the water whilst the foreign matter remains, subsequently forming the huge white conical mounds of sand which are a typical feature of the landscape in many parts of Cornwall and Devon.

Ultimately the clay is recovered from the water by the natural process of sedimentation, after which it is cut into rectangular blocks and dried. During recent years the time required for production has been reduced by using presses to assist in the extraction of the water. With the old methods, however, and which are still widely used, the process of recovery occupies from six to eight weeks from the time the clay is first "washed" until it is properly dried.

China clay is an invaluable commodity because its uses are so widely varied. Huge quantities are required by paper makers, whilst it becomes the ingredient of medicines, cosmetics, paints and distempers. It is even employed in the manufacture of linoleum, white celluloid goods, soap and a hundred and one other things, not overlooking pottery and china generally.

There are deposits of china clay in other parts of the world, but the quality of the Cornish product, together with the price at which it can be produced, explains the increasing demand.

An important factor toward the competitive price at which it can be shipped, is the costly and elaborate facilities for loading which the Great Western Railway Company have provided at Fowey.

Even in the year 1880 seven jetties were available, and these were equipped with tipping shoots at each jetty head for bulk loading, whilst cranes handled supplies of clay packed in casks or bags.

This equipment was satisfactory so long as the vessels concerned in the trade did not exceed 300 tons, and which was the case in those days, for these small craft merely conveyed their cargoes to Liverpool for re-shipment.

In course of time vessels of considerable tonnage came to Fowey in order to take consignments direct overseas. Then it became necessary for tipping operations to be suspended for varying periods before and after high water owing to the fact that the average tidal rise at Fowey is 17 ft., and when the ship's side rose above the level of the chutes on the jetties, loading by gravity became impossible.

In 1923 an additional jetty known as No. 8, which had been commenced prior to the war, was brought into use.

Owing to its position in the river it was not possible to build this jetty at right angles to the mainland as had been done in the case of the others.

The jetty structure was, therefore, placed roughly parallel to the river bank, having a length of 540 ft. with a straight frontage of 310 ft., so that the largest type of vessel visiting Fowey is enabled to moor alongside without unduly projecting into the fairway.

Having a width of 50 ft. on the deck, this jetty is constructed of steel girders which, together with brick arches and concrete, is supported on twenty-three steel cylinders, each 6 ft. in diameter and having their foundation upon the virgin rock. After they were sunk the cylinders were filled with concrete.

The capacity of the conveyor is 240 tons per hour, the same as that of jetty No. 4, and larger generators were installed in the power station in order to cope with the extra load.

There are many varieties of china clay, and each classification must be stowed independently and with due regard to the sequence of discharge at various ports. This is a complicating factor which requires the utmost skill and good management in order that the work of loading may proceed continuously.

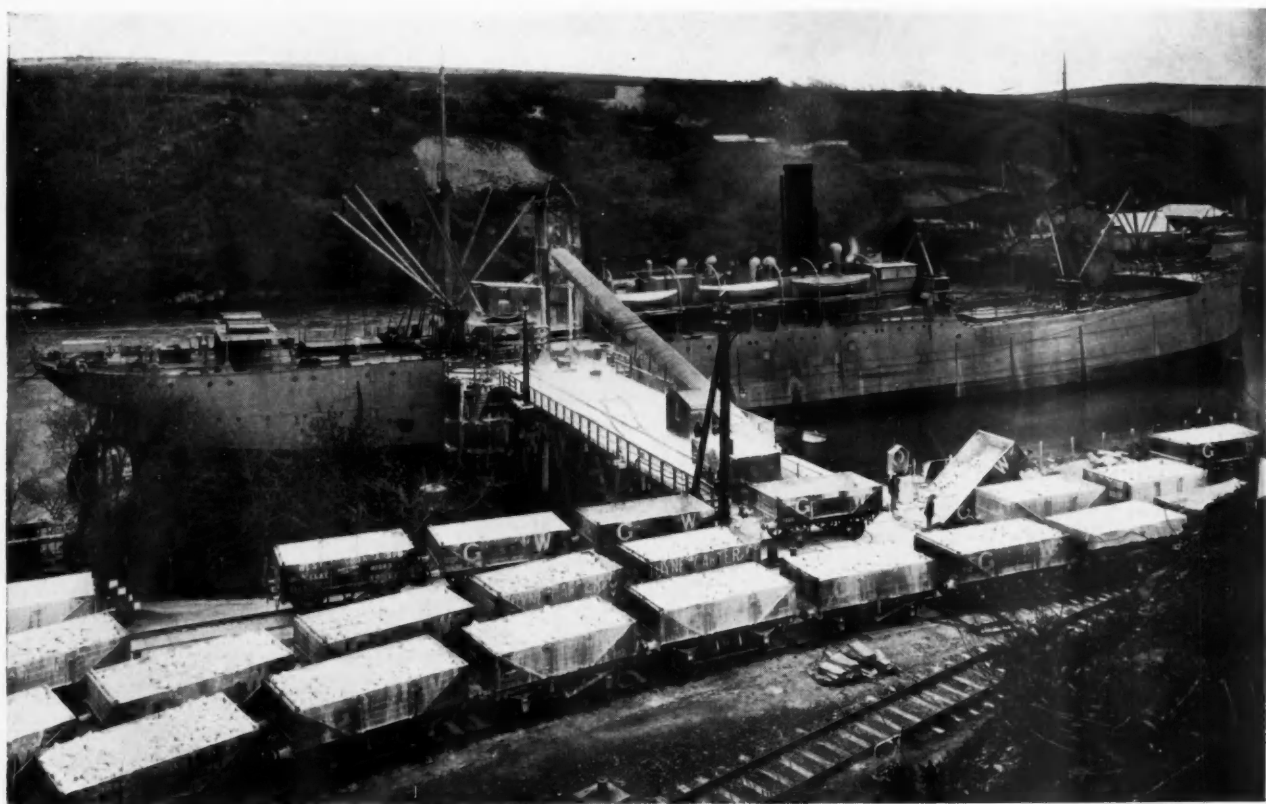
In the case of jetty No. 8, railway wagons containing clay in bulk pass on to a tipping table situated at the foot of the jetty, and are tipped so that the clay falls into a large hopper without the need for man-handling.

The clay is then fed on to a belt, travelling at about 125 ft. per minute, and this climbs to a height of 37 ft. above jetty level, and thence by means of a cross belt, and either of two horizontal belts, to a further short belt situated on a movable tower which carries the discharge chute. This is adjustable to various conditions of loading, and furthermore it is provided with a trimming nose which enables the clay to be deposited over a wider area in the hold, thereby reducing the need for trimming by hand.

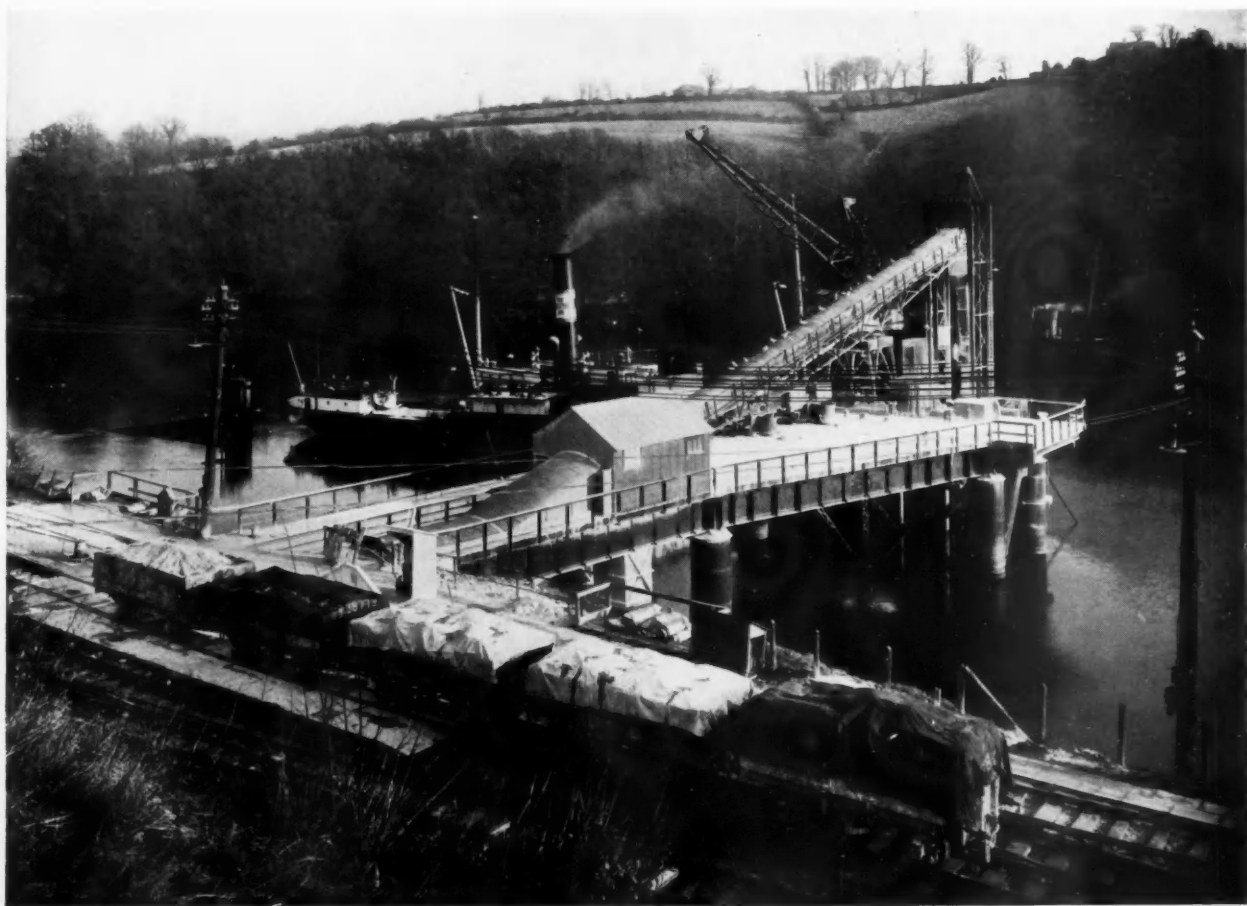
The hopper is formed in one half of a silo which is sunk in the ground, and has an internal diameter of 34 ft. 6 ins., the floor being 23 ft. below rail level.

The construction of the silo consists of two steel skins suitably braced, the space between being filled in with concrete.

Shipping China Clay at Fowey



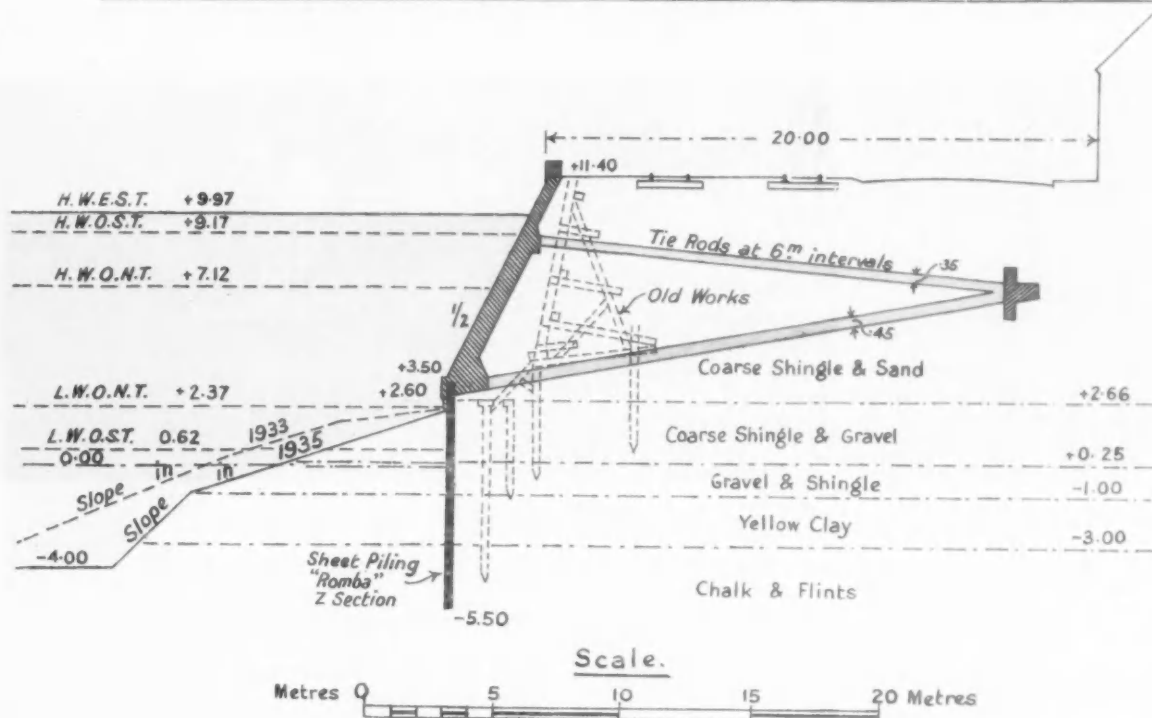
No. 4 Jetty, showing the large type of vessel which comes to Fowey.



No. 4 Jetty. The mooring "Dolphin" is visible on the left.

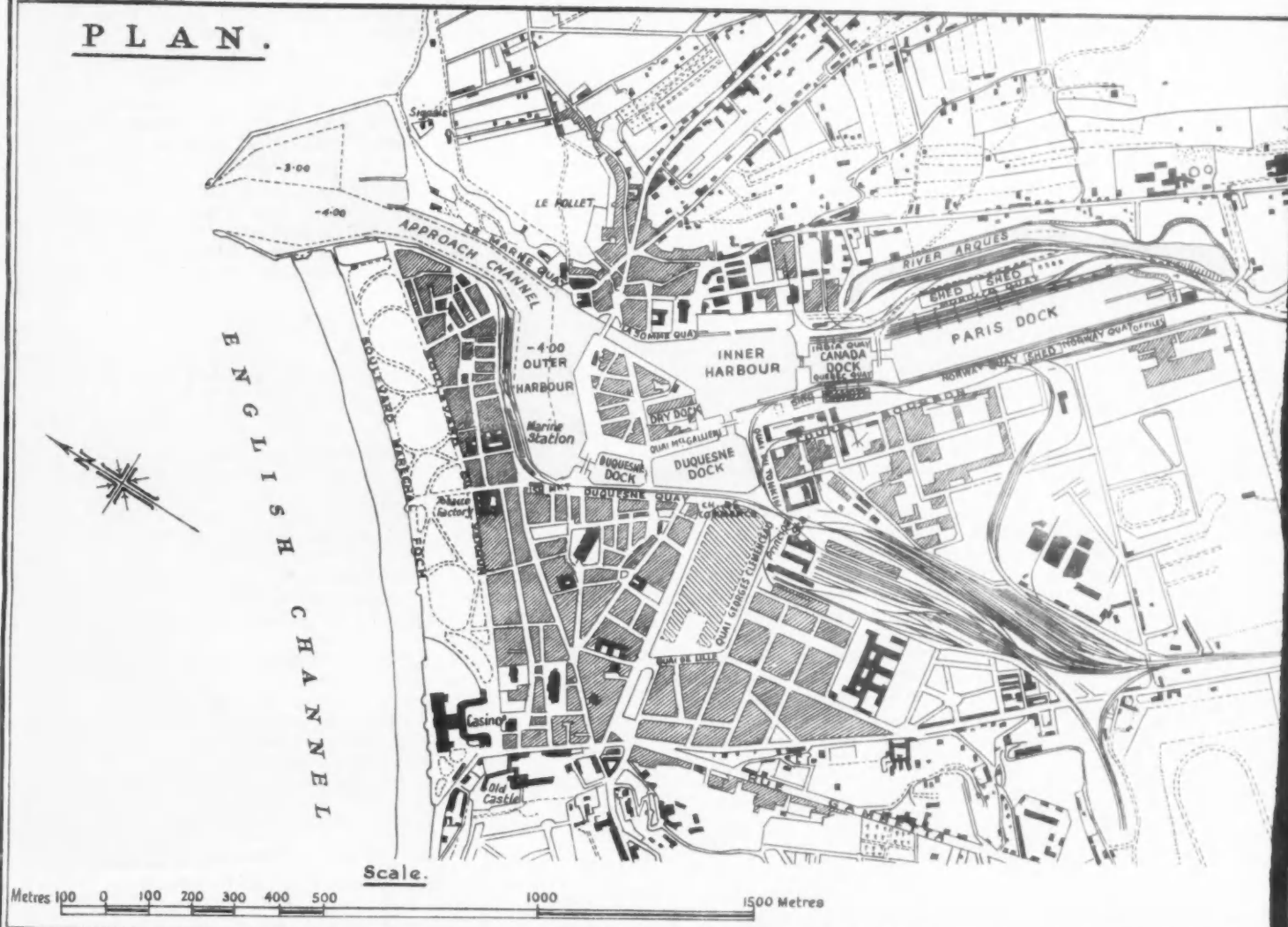
PORT OF DIEPPE

UNDER THE JURISDICTION OF THE MINISTRY OF PUBLIC WORKS, PARIS.



SECTION OF WALL AT PETIT-VENTES.

PLAN.

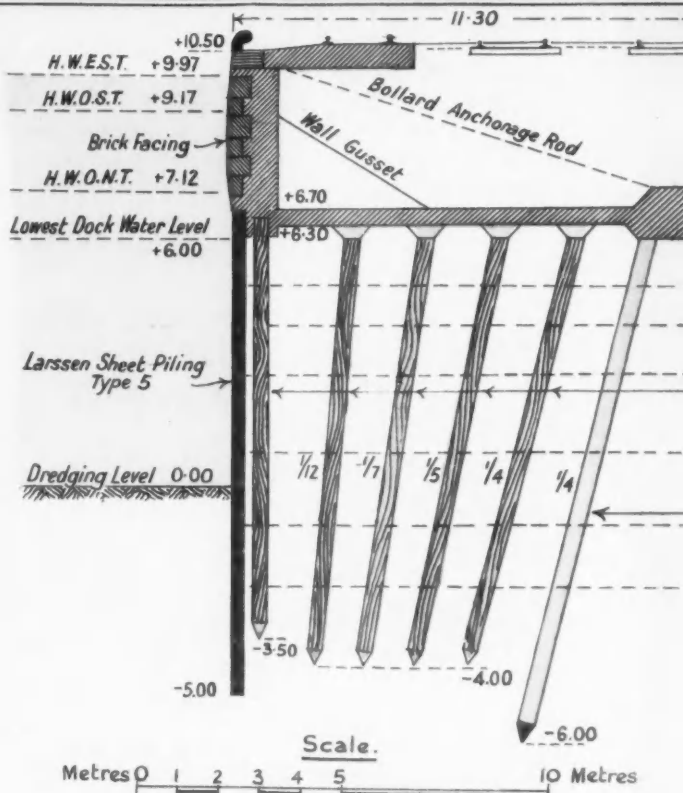
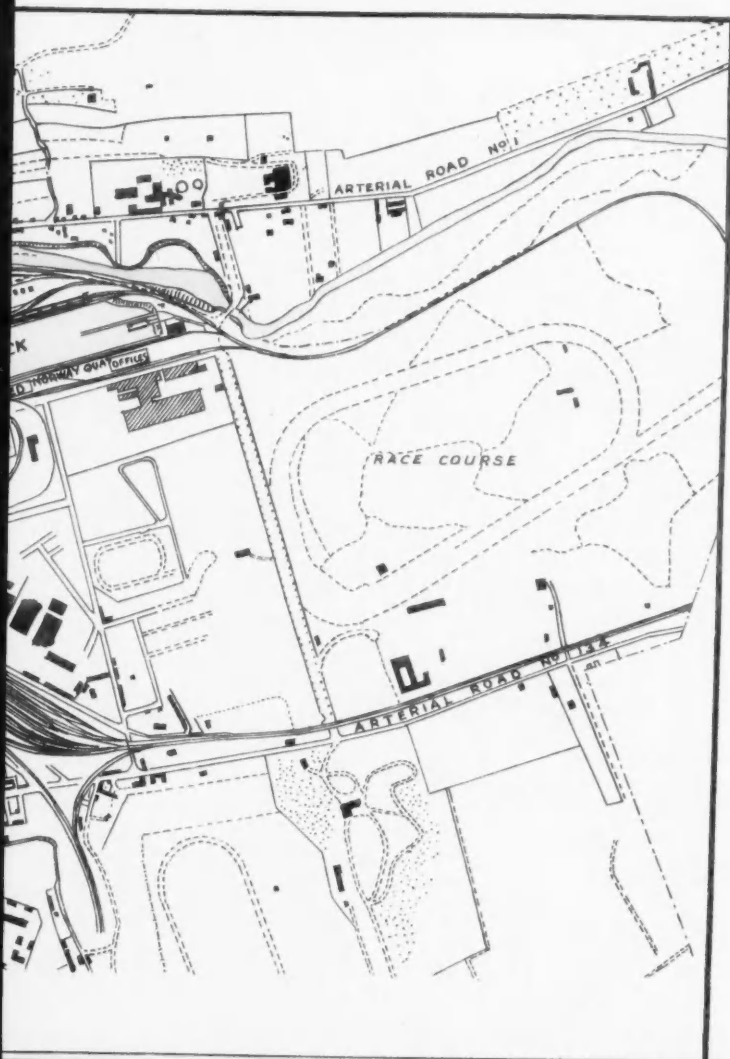


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WORKS, PARIS.



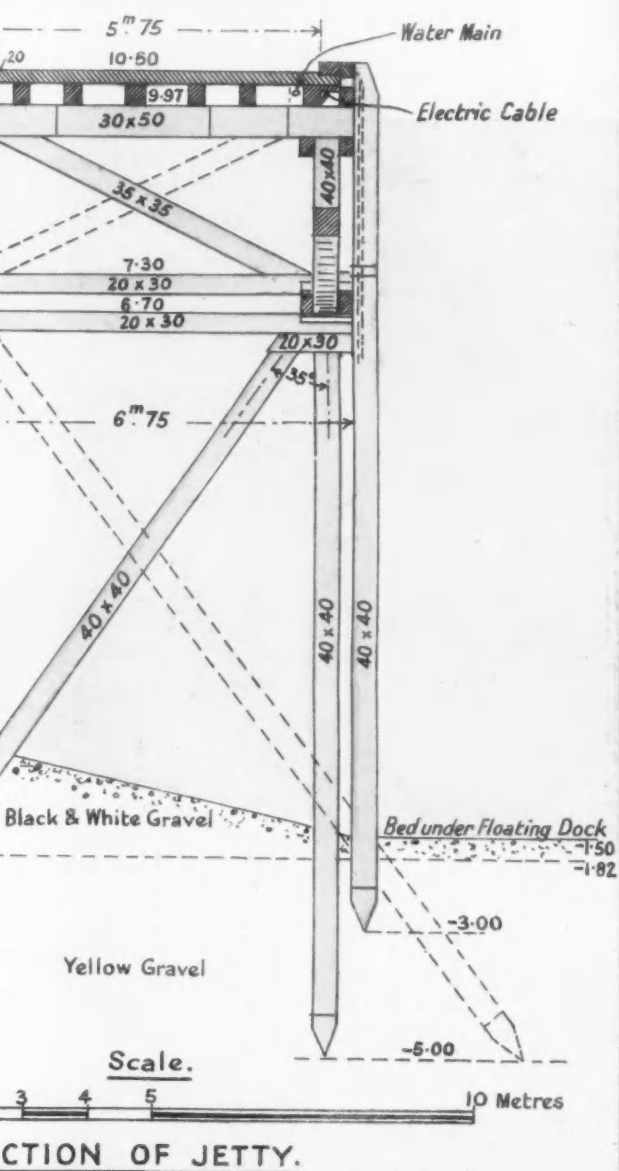
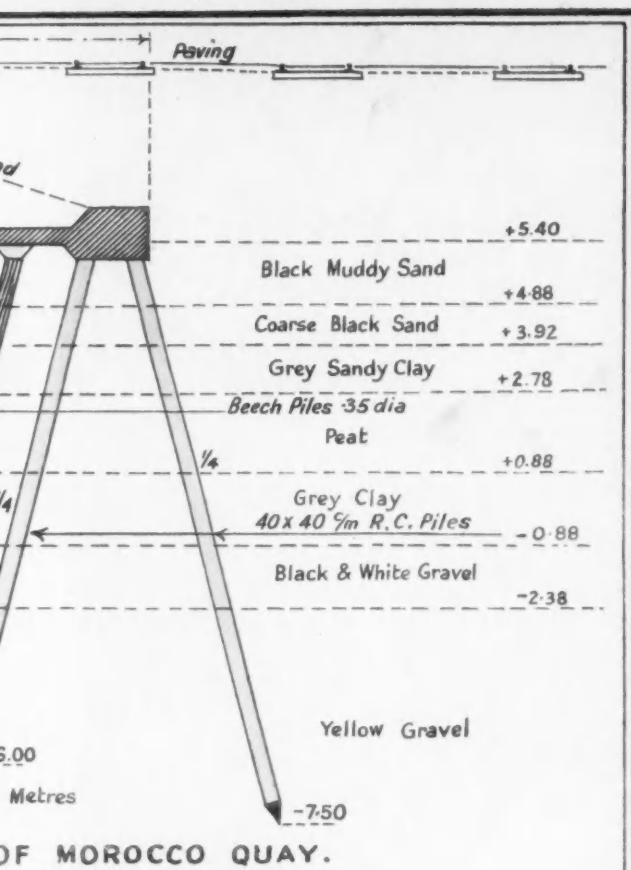
+2.66
+0.25
-1.00
-3.00



SECTION OF MOR



SECTION



PORT OF DEER

THE PORT OF DEER IS A SMALL VILLAGE IN THE NORTH-WEST CORNER OF THE ISLAND OF DEER.



Shipping China Clay at Fowey—continued

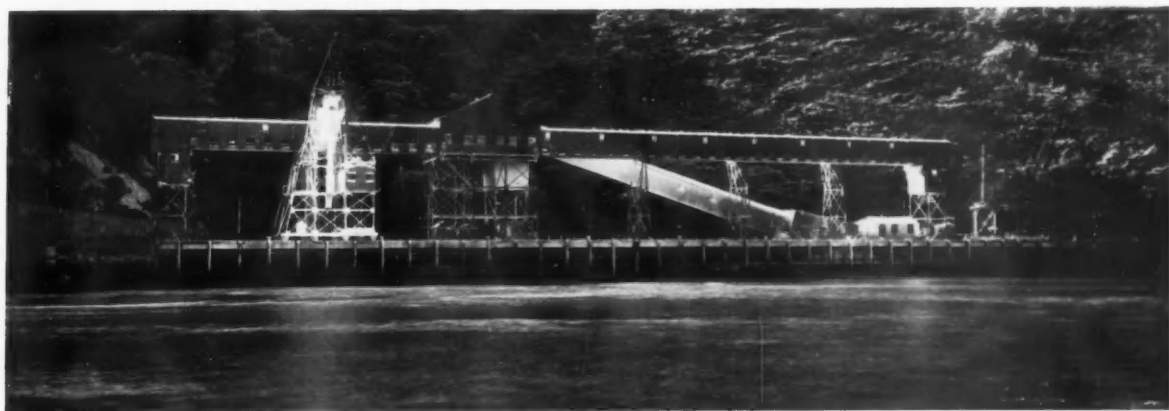
One reason for this form of construction was to prevent the ingress of water, whilst it was also important to provide an absolutely rigid structure on the water edge.

The original arrangement allowed for two complete sets of tipping tables and belts, but although the silo is large enough to supply these, only one set has been constructed and is in use at the present time.

complete safety and without risk to the vessels or the jetty structure.

This special mooring was all the more necessary in view of the larger boats of from 5,000 to 10,000 tons, and between 350 ft. and 450 ft. in length, which have been using the port during recent years.

The provision of this "Dolphin" also enables the larger



Jetty No. 8, showing the extent of the Equipment.

A 3-ton electric crane travels along the quay or jetty face, and is available for dealing with clay in casks or bags.

With the conveyor equipment described, and which was supplied by Spencer (Melksham) Ltd., 4,000 tons of china clay has been shipped in one day, but as some of the old jetties were due for renewal and it was evident that further facilities for loading clay in bulk would be a great advantage, the Great Western Railway Company decided to increase still further the shipping amenities at Fowey, and in 1932 jetty No. 3 was re-built and equipped with a conveyor similar to that on jetty No. 4. In this case, however, the tipping arrangements are worked from an overhead structure and the angle of tip is greater than that at jetty No. 4.

Later, in 1934, jetty No. 4 was also re-built, the conveyor modernised and an independent stone tipper with improved design of chutes provided, together with a new 3-ton level luffing crane supplied by Messrs. Cowans, Sheldon, Carlisle, for handling casks and sacks.

As No. 4 jetty lies below a sharp bend in the river where the strong tides make large vessels "range," the Company provided, about 10 years ago, a very expensive "Dolphin" mooring in the stream about 200 ft. above the jetty. This enables the large craft which use the jetty to be moored in

vessels to continue their loading at all states of the tide.

Approximately 900,000 tons of china clay has been shipped from Fowey in a peak year, but the alterations to No. 8 jetty in 1923, together with other improvements, made possible the shipping of 1,000,000 tons per annum should the state of trade so require. Unfortunately the depression prevented this figure being attained, and even during the present year shipments have not exceeded 600,000 tons.

Notwithstanding these facts, however, the Great Western Railway Company are constantly looking ahead and have incurred considerable further expenditure in modernising the facilities on the jetties. The provision of a belt conveyor at No. 3 jetty, and which makes the third to be so equipped, is an important addition to the loading facilities available and which, from the point of view of capacity, now greatly exceed the figure of 1,000,000 tons.

In conclusion, it should be mentioned that No. 7 jetty, which lies just below No. 8, is used mainly for dealing with imported coal, and after reconstruction about 10 years ago, it was re-equipped with two 3-ton electric luffing cranes having a hoisting speed of 250 ft. per minute.

Although practically all the coal traffic is dealt with at this jetty, when necessary, it can also be used for loading of clay in casks and bags.

River Weser Inland Shipping in October, 1936

During the first 20 days of October, 1936, water conditions continued to be insufficiently satisfactory. However, an improvement took place after this period, due to rainfall. However, full loading was still only possible on two days on the Upper Weser and on six days on the Middle Weser. These good conditions did not continue into November. Up to the 9th and 12th respectively, water level fell continuously. Full loading was not possible on the Upper Weser on any day, and on the Middle Weser only on the first two days of November.

Inland shipping through the Bremen Weser Lock and via the Kustenenkanal through the Oldenburg Lock amounted to 319,500 tons in October, compared with 293,400 tons in September, 1936, that is 23,100 tons, or 8 per cent. more. Both routes showed increases in upstream and downstream traffic. Supply of coals at 72,200 tons, was rather more than in the previous month. Due to the unsatisfactory water conditions on the Middle Weser, the coals were carried for the most part via the Kustenenkanal. Of the total amount carried during October, 231,600 tons (215,900 tons in the previous month) fell to the Middle Weser, and 87,900 tons (80,500 tons in September) to the Kustenenkanal.

The quantity of goods carried during the months from January to October, 1936, amounted to 2,569,100 tons, compared with 1,735,300 tons during the same period of the previous year. This was an increase of 833,800 tons, or 48 per cent., chiefly due to greater transport of gravel, stones, sand and cement for building purposes, as well as an increase in transport of industrial coals, in particular for the use of the re-opened foundry in Bremen and the greater consumption of the power station. The increase was only in downstream traffic,

which amounted to 2,204,200 tons, thereby showing an increase by 891,600 tons, or 68 per cent. Upstream traffic at 364,900 tons was 57,800 tons, or 14 per cent. less. 469,500 tons were carried via the Kustenenkanal.

During October, 1936, 193,200 tons passed through the Bremen Weser Lock downstream. That is 10,400 tons, or 6 per cent. more than in the previous month. Upstream traffic amounted to 35,400 tons, i.e., 5,300 tons, or 18 per cent. more.

During the months from January to October, 1936, downstream traffic amounted to 1,789,000 tons, compared with 1,279,000 tons in the same period of 1935. This is 510,000 tons, or 40 per cent. more. The increase was chiefly due to an increase in the transport of gravel, sand, stones and cement, which increased by 560,000 tons. Upstream 310,600 tons, that is 88,800 tons, or 22 per cent. less, were shipped.

Downstream 83,000 tons were shipped through the Oldenburg Lock, compared with 76,000 tons during August, that is 9,000 tons, or 12 per cent. more, chiefly caused by the increase in coal transport already mentioned above. Upstream 4,900 tons were carried, which is a slight increase.

During the first ten months of the year downstream traffic amounted to 415,200 tons via the Kustenenkanal. 88 per cent. of this was coal. Upstream 54,300 tons were carried, consisting chiefly of iron scrap, piece-goods and grain.

Record Coal Shipment.

The L.N.E.R. report that on Saturday, November 21st, 25,308 tons of coal were shipped at the Company's Blyth Staiths. This is the largest quantity of coal which has ever been shipped from the Staiths in a single day. No less than 40 vessels entered the Port of Blyth for loading on Friday, the 20th, and 25 were loaded outward on the 21st.

Shipping China Clay at Fowey

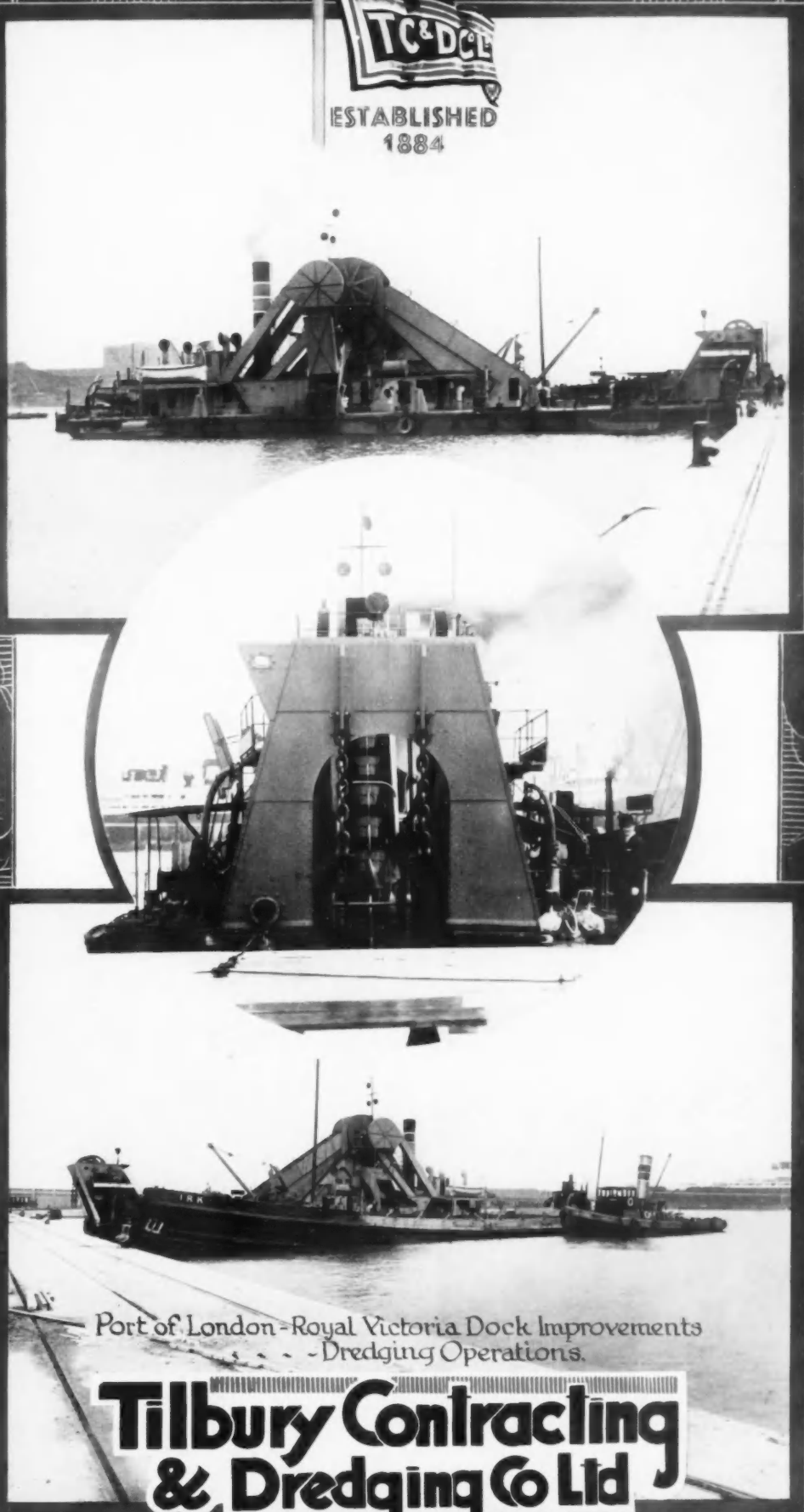


No. 4 Jetty. The manner in which the Conveyor and Chute is raised and lowered is clearly indicated.



Jetty No. 8.

TC & DCL
ESTABLISHED
1884

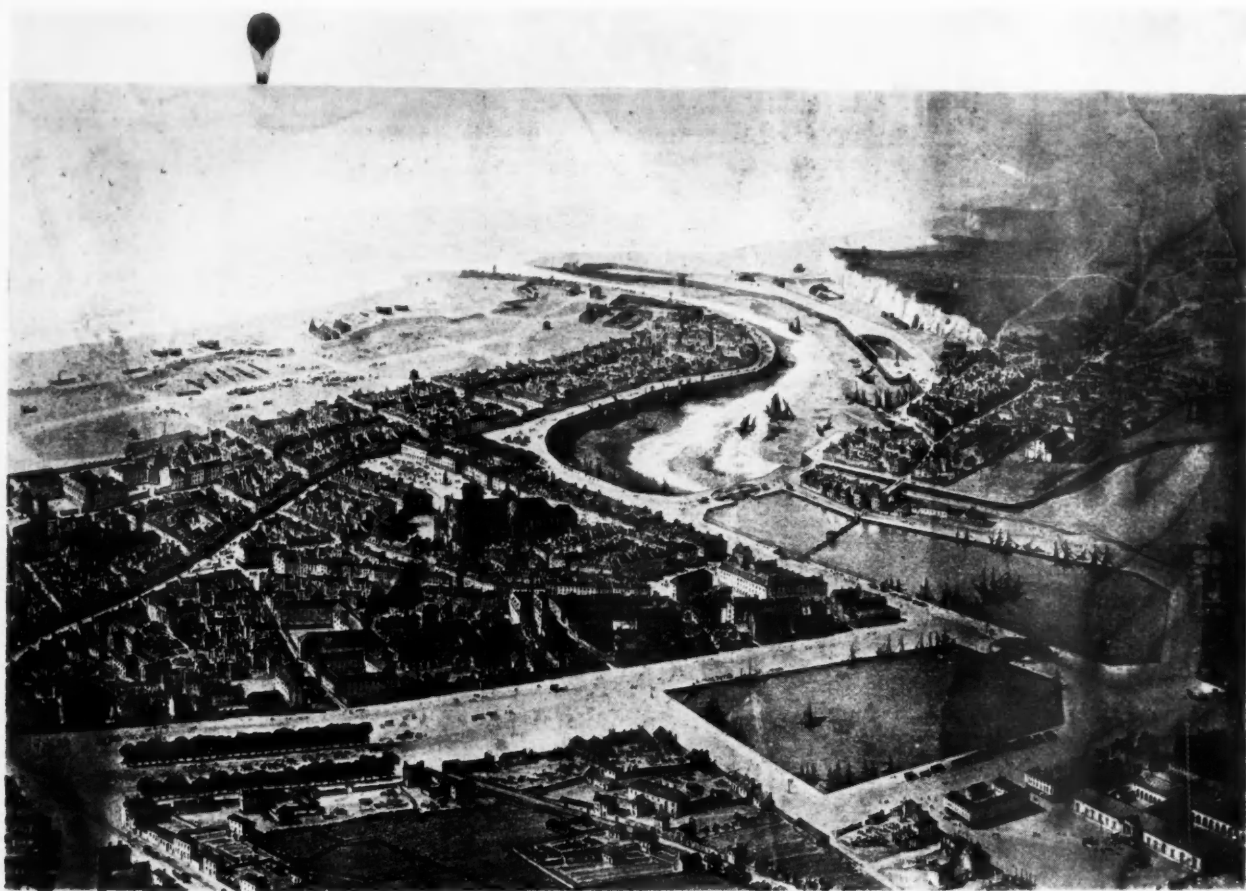


Port of London - Royal Victoria Dock Improvements
- Dredging Operations.

**Tilbury Contracting
& Dredging Co Ltd**

Tilbury House, Petty France,
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Port of Dieppe



Birdseye View of the Port, taken from a Balloon in 1850.



Aerial View of the Outer Harbour and the Roadstead.

The Port of Dieppe

By P. PÉTRY, Ingénieur des Ponts et Chaussées



Quebec Quay.

I.—Historical

AT the beginning of historic time, the three rivers, Eaulne, Béthune and Varenne, were united in a common estuary to form an extensive basin enclosed between banks extending to the present site of Arques and subject to tidal ebb and flow. This natural port, well sheltered within the coast line, was the first point frequented by the ships of the Normans, by fishermen and by pirates. Up to the middle of the eleventh century, fishing was actively pursued within this sheltered harbour, and salt-pans were long in use three kilometres above the site of the present outer harbour.

The Normans, attracted by this site, created here a port which became the most important in the province as well as the port of communication with England.

The place where Dieppe was to arise was then confined to a strip of shingle closing the mouth of the valley, washed on one side by the sea and on the other bordering the marshlands.

Herring fishery brought great prosperity to the whole coast. About the year 1300, the people of Dieppe kept Paris supplied

with fresh fish by means of a regular service of vehicles, which came to be known by the name of "chasse marée," or "fresh sea-fish cart."

In 1364, navigators of Dieppe began their voyaging about the world. They reach in succession the Guinea Coast, the Canary Islands and Cape Verde. They establish the agencies of Little Lieppe and of Paris and bring home their first cargo of ivory.

Louis XI., Charles VIII., Louis XII. and Francis I. grant, each in turn, special protection to Dieppe. Such marks of royal favour could not fail to provoke emulation among the hardy seamen of the port.

Two of them, the brothers Parmentier, reach Newfoundland in 1508, Brazil in 1520. They then go to India and China and are the first to plant the French flag in Sumatra. In this last expedition, the two ships commanded by John Parmentier belong to the most famous of the Dieppe ship-owners of the time, named John Ango—from the Scandinavian, Amgot. As promoter of a multitude of prosperous ventures, he has agencies everywhere and ships on all the seas. He lends money to

Francis I. and provides him with vessels, armed like his own for privateering. He undertakes himself to secure respect for his merchant fleet and does not hesitate, even in time of peace, to order the bombardment of Lisbon by seventeen ships, to avenge the capture by the Portuguese of one of his merchantmen.

At this period Dieppe is at the zenith of her power. The town has a population of 60,000.

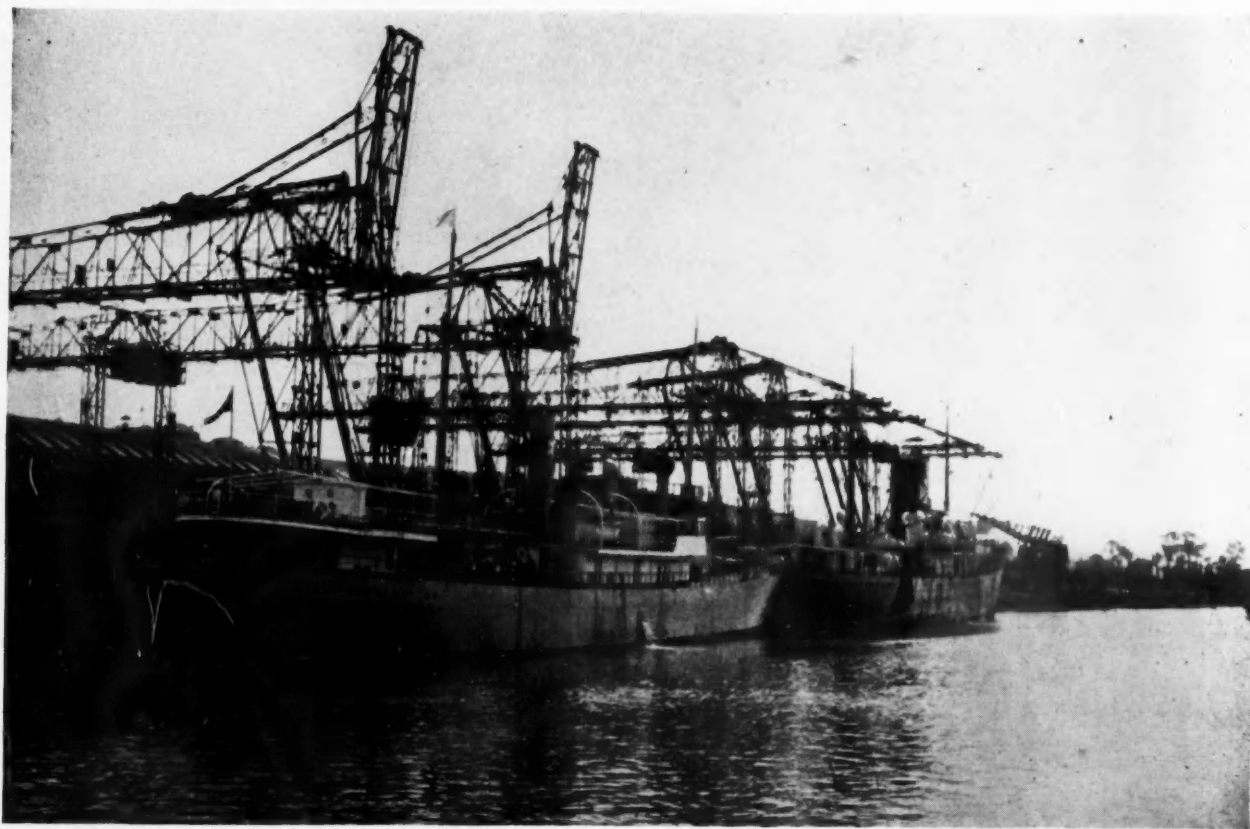
In 1562, Coligny sends the Dieppe captain John Ribault, with a fleet of five vessels, to found a colony in Florida. In 1625 it is once more a man of Dieppe, Vaudrosque Dyel, of Esnambuc, who, in a brigantine of eight guns, goes off on his own account to land in the West Indies and there to share with the English, who cast anchor at the same time as himself, the Island of St. Christopher. In 1635, supported by Richelieu, he goes to Martinique, builds a fort at St. Pierre and annexes the island for France.

We must also recall the famous name of Duquesne, Admiral of France, born at

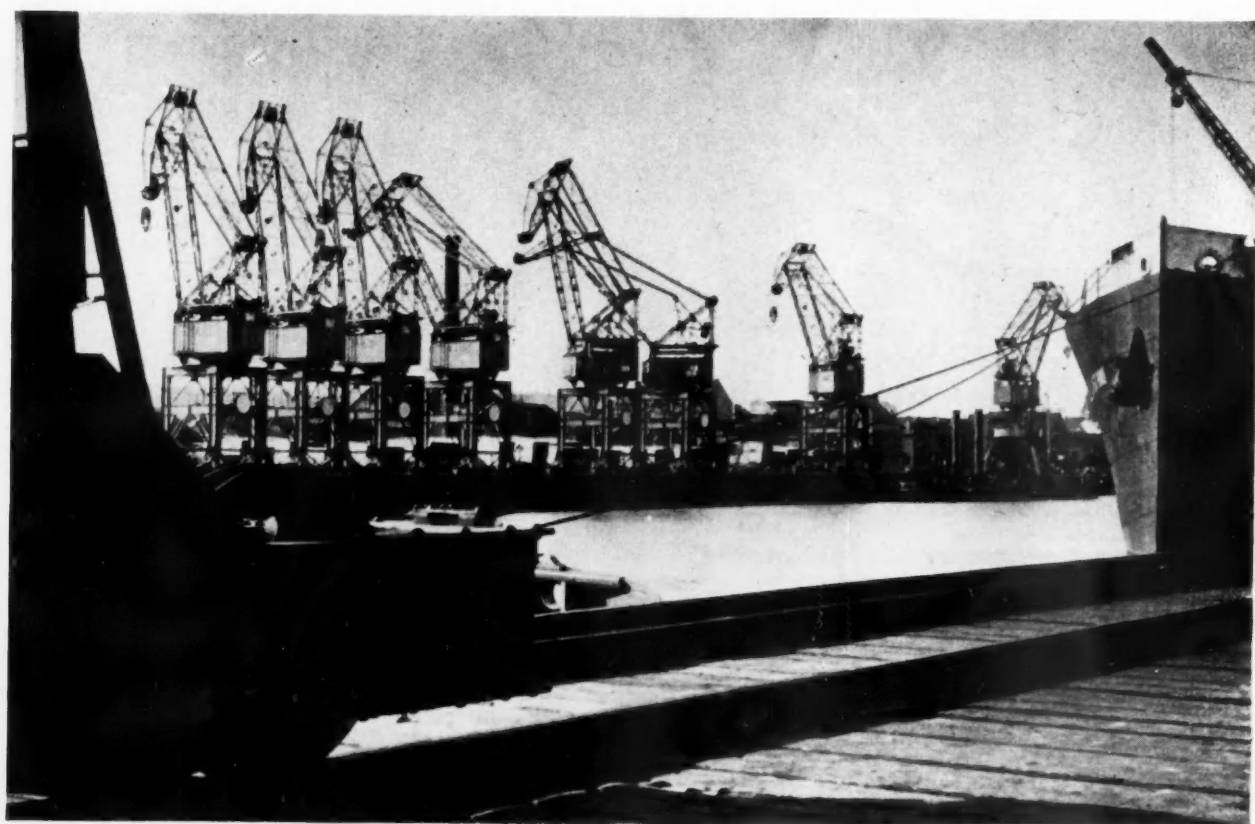


Colbert Bridge, 1889.

Port of Dieppe



Landing Lemons from Italy and Oranges from Palestine, at the Morocco Quay.



Equipment of Norway Quay.

Port of Dieppe—continued

Dieppe in 1610, who, on two occasions, defeats Ruyter, the foremost seaman of Holland.

After the abounding activity of which we have been recounting some episodes, came the "wars of religion" witnessing a prolonged period of inaction. Long-distance voyages are abandoned. Le Havre takes advantage of this lapse which enables it to establish regular traffic with the New World.

Dieppe then is reduced to the condition of a modest fishing port. Under the reigns of Henry IV. and Louis XIII., there is no improvement.

In 1672, a violent storm obstructs the harbour by a deposit of shingle. Colbert comes to view the disaster on the spot, to investigate its cause and advise upon remedial measures. He formulates the project of filling up the old entrance channel and of cutting a new one through the town, forming in the line of it a powerful flushing sluice which should impound the water at high tide and discharge it at low tide in order to clear away the shingle. But this proposal is not carried out.

Vauban brings forward a project of improvement and enlargement of the harbour, with extension of the jetties to counteract the encroachment of the shingle. But he has no better success.

In consequence of a storm of very great violence occurring in 1775, the authorities again show concern. The Inspector-General of Finance, De Trudaine, requires the Engineer, Lamblardie, in 1776, to draw up a programme of works, and this is put into execution. Although brought to a standstill by the Revolution, this programme is again pursued later on under the Empire.

Throughout all this time, fishing flourished.

For nearly seven centuries, the seamen of Dieppe carried on herring and mackerel fishery, both with the net and with the line. They devoted themselves also to cod-fishing and even the hunting of porpoises and whales.

They had often to suffer the effects of feudal wars, especially those in which France and England were opposed. During these various periods, "fishing truces" were sometimes concluded between the belligerents, but they were often broken. For self-protection the Dieppe fishermen were convoyed by an escort of vessels armed as for war, at their expense. Thus in 1383, Dieppe fitted out two large galleys and one small one, to accompany and protect the herring boats. This action was frequently repeated in later years.

In 1649, the Dieppe fishing fleet numbered 150 drag-net boats, which brought back from the Picardy coast an immense quantity of herrings. This prosperity reached its height in the eighteenth century when, in the year 1787, there were landed 10,898 "lasts" of fish, a "last" weighing about 2 tons.

On the outbreak of the Revolution, the National Assembly issues a call to revive privateering—or guerilla warfare by corsairs. Dieppe, which is no novice in this line, responds



The Steam Packet "Versailles" at Dieppe.

with alacrity. Small fighting units are improvised with fishing boats such as one thus named—"the Shark, Captain Lanchon, of Dieppe, armed with one cannon, two small cannon, four blunderbuses and twelve muskets." These little boats unite in groups of three or four to attack cargo-carrying brigs, better armed than themselves, and take them by boarding.

From 1793 to 1795, French corsairs or privateers capture 2,099 merchant vessels, of which 1,636 are English. But the French have worse fortune in the years that follow. Among the first ships taken, appear Dutchmen and Americans. Afterwards the latter will not voyage unless insured by their owners against "risks of France and the sea." The Peace of Amiens brings a truce, but only a short one; in June, 1803, the English take, in the Dieppe roadstead, 22 boats carrying 174 deep-sea fishermen; reprisals rapidly follow and substantial captures are made; the famous Balidar takes a number of brigs, each of which is sold for many hundreds of thousands of francs. Early in 1809, sailing in the "Embascade" (Ambush), he sights a brig carrying 20 guns and captures it by boarding. Laden with valuable Colonial produce, this vessel is sold at Dunkirk for 1,304,444 francs; the crew receive 380,000 francs, the owners 670,791 francs; two 1,000-franc shares earn 25,706 francs profit. No wonder that Balidar is found in a tavern at Roscoff, heating golden coins in a stove and throwing them out of window to people in the street, for the fun of seeing them burn their fingers in picking them up!

In 1814, the corsairs had taken from the English 10,871 vessels. Their exploits came to an end at the same time as the Empire.

Under the Restoration, Dieppe equips ships for the voyage to Newfoundland. In 1820 the port possesses 33 vessels for the cod fishery.

But now, with the introduction of the trawl-net, arises fresh activity in fishing on the home coast. The trawl had undergone various vicissitudes before being adopted here. Its use having been forbidden in 1726, prohibited again in 1766, it triumphs at last and in 1824 Dieppe can boast of 60 trawlers of 25 tons and 50 herring boats.

The numbers equipped are:—In 1887, 122 sailing and 2 steam trawlers; in 1905, 746 sailing and 21 steam trawlers; in 1910, 566 sailing and 18 steam trawlers.

The fresh and salted produce of various fisheries, in the years before the War, reaches an average of more than 2,000,000 francs a year. During the War, many trawlers of Dieppe acquit themselves with credit under the attack of German submarines. Then motor-driven trawlers make their appearance.

In 1843, the first railway trains come from Paris to Rouen and a few years later from Rouen to Dieppe. The public passenger service which was already operating between Dieppe and Brighton once a week since 1790 was strengthened, being served by a wooden paddle steamer called the "Magician" and putting in at Newhaven. The London, Brighton and South Coast Railway Company had three

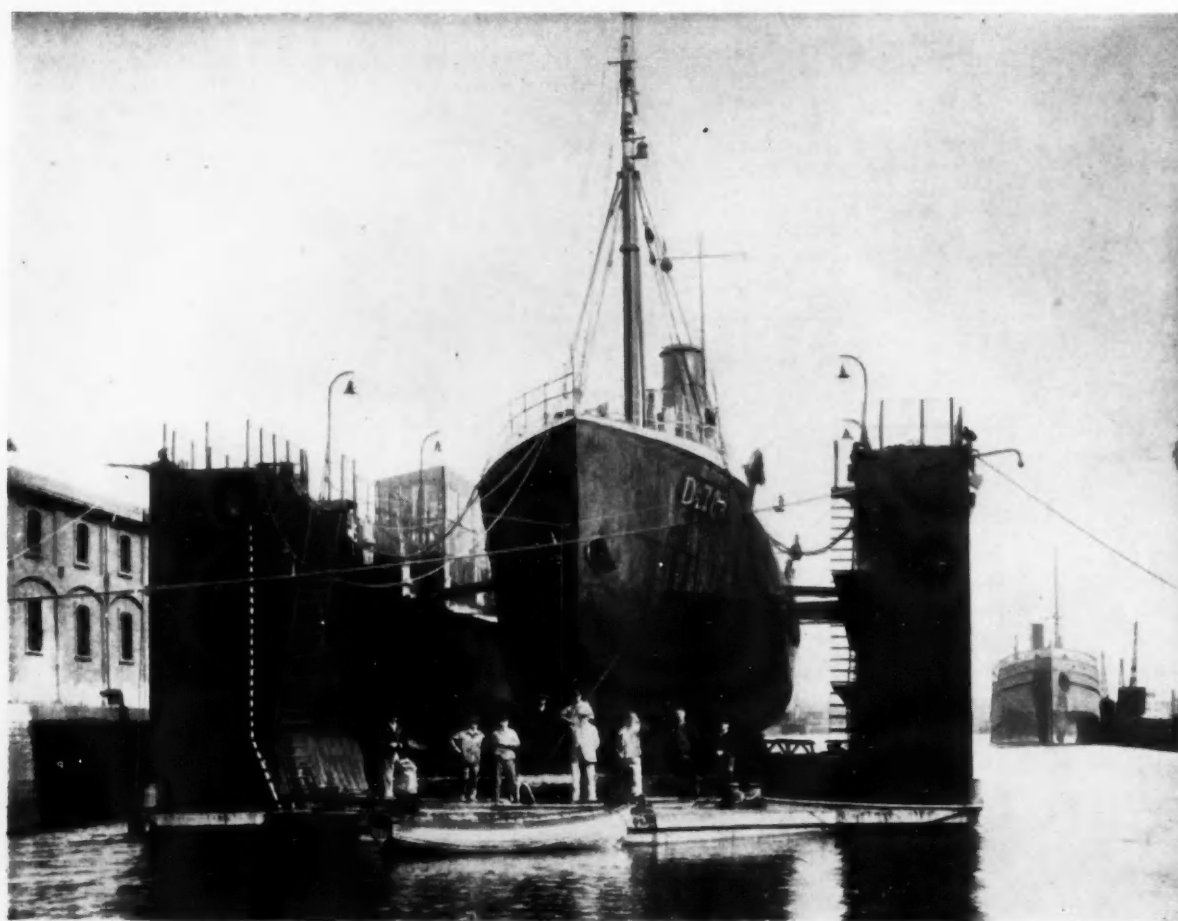


Dredger "Dieppe IV."

Port of Dieppe



Cranes on the India Quay.



The Floating Dock.

Port of Dieppe—continued

boats built of mahogany, with reciprocating engines and paddle wheels; in 1856 this Company concluded an agreement with the French Western Railway Company (Chemins de Fer de l'Ouest) to establish a joint service, which has continued to prosper ever since and is still in operation to-day.

The Law of 3rd April, 1880, enacted the establishment at Dieppe of a system of works comprising an inner basin, connected with the outer basin by a passage called the Pollet Channel, a half-tide basin—now the Canada Dock—and wet dock—now the Paris Dock. An opening bridge 70 metres long was provided in 1889 across the new passage.

A graving dock was formed adjoining the inner basin.

The decree of 17th August, 1895, provided for a quay, serviceable at all states of the tide, in front of the Marine Station.

In 1903, new works were undertaken to improve the access to the passage. Converging bell-mouth jetties were constructed to protect the entrance against the encroachment of shingle and to moderate the effect of the swell from seaward.

The Paris Dock was lengthened by 170 metres, between 1914 and 1922, while at the same time on its Eastern side a wharf was formed for a length of 300 metres. A 300-metre quay on the South-East and a 170-metre jetty at the South end complete the accommodation at this Dock in 1935.

During the year 1932, the Anglo-French service carries 250,000 passengers; fishing reaches a value of 51,000,000 francs and goods traffic a total of 780,000 tons; thus making good use of the port which we are about to inspect.

The world crisis has slowed down traffic a little, but has not interrupted works of improvement.

The Berigny Basin, closely hemmed in by the buildings of the town, is now being filled in, to form a public garden. The filling of the entrance to this Basin has taken away the necessity of crossing a moveable bridge by trains running to the Maritime Station.

II.—Description of the Port

The Port of Dieppe is not a self-governing administration. Its director is the Chief Engineer of the Ordinary and Marine Services (Second Section) of the "Ponts et Chaussées" in the Seine Inférieure. The equipment is under the management of the Chamber of Commerce, excepting the Graving Dock which is managed by the Penhoet Works of St. Nazaire.

Having ample depth of water, as its name implies (for "Dieppe" is held to be derived from the Anglo-Saxon word "deep"), the harbour affords absolute safety to shipping. Its depth places it among the first six ports of France.

Situated in latitude 49 degs. 55 mins. 34 secs. North and longitude 1 deg. 4 mins. 42 secs. East of Greenwich, sheltered on the West by the projection of the Pointe de l'Ailly, its roadstead extends for about 5 kilometres beyond the harbour mouth;



Fleet of Trawlers sheltering in the Paris Dock on a stormy day.

It affords good anchorage on a sandy bottom, overlying a calcareous tufa; but it is not sheltered from on-shore winds.

There is a depth of 6 metres below low water at 600 metres out and 8 metres at 1,500 metres out from shore.

The entrance lies in the direction North-North-West and is 100 metres wide between the vertical faces of the pier-heads. Two jetties prolonging the lines of the bell-mouth mark a manoeuvring area of which the greater part is carried down to the depth of—4.00. At 420 metres inward from the harbour mouth, the curved internal channel commences, having a length of 400 metres, a width of 75 metres, and a depth of 4 metres below zero, giving a depth of water of about 11 metres at neaps and 13 metres at spring tides.

On the West bank, an old framed timber jetty was replaced in 1935 by a retaining wall in reinforced concrete, with steel pile camp-sheating retaining the bank at a considerable height.

The outer harbour is approached directly from the entrance channel, it has a bottom depth of —4.00, is utilised by the Dieppe-Newhaven service and frequented also by trawlers of the fishing fleet. It is extended into the Fish Dock, whose depth is at zero of charts.

The inner harbour is reached from the outer harbour by the Pollet Channel and has a bottom depth of—1.50. From the inner harbour, the retaining lock leads to the Duquesne Basin, depth + 1.62; the lower lock to the Canada Dock depth —1.00; and the upper lock to the Paris Dock, at zero of charts.

The plant for maintenance of depth was recently brought up to date by the arrival of the ladder dredger "Dieppe IV.", with $\frac{3}{4}$ cubic metre buckets and Diesel electric motors, built at Havre, and the hoppers "Lavoinne" and "Berigny," of 450-cubic-metre capacity, likewise Diesel electric driven.

Projected Improvement.

A scheme is under consideration for the construction of three breakwaters, or groynes, on the East of the entrance, to ensure calm water in all weathers in the outer and inner harbours.

Properly speaking, there is not merely one port of Dieppe but three separate ones; the passenger port for the Anglo-French service, the fishing port and the commercial port. These call for description separately.

III.—Anglo-French Passenger Port

The accommodation for the Dieppe-Newhaven cross-Channel line, is located in the outer basin, where it occupies a quayage 370 metres in length, giving berths at which two passenger boats and two cargo boats can lie together. The Marine Station stands opposite the passenger boat moorings, which enables travellers to pass direct from boat to train or vice versa. Opposite the cargo boat moorings lies the goods station, with an extensive grid of railway sidings.

Five steam cranes of 5-ton maximum capacity can travel along the quay and operate at any one of the passenger or cargo boat berths.



Cases of Bananas from the Canary Islands in Shed "C."

Port of Dieppe—continued



Impact of a wave on the recording apparatus at the Old Pier Head.

This outer basin is tidal, but the bottom is maintained at a sufficient depth to enable the boats of the cross-Channel service to enter and leave, according to time-table arranged to suit the train service, at any state of the tide.

Passengers.

The passenger service is effected by two departures daily from each port, Dieppe and Newhaven, one by day and one by night.

The fleet which maintains this service is the joint property of the French State Railways and of the English Southern Railway. It is at present composed of six vessels—three under the French and three under the English flag—from 1,500 to 2,000 tons, which reach a speed of 25 knots and make the crossing in 2½ hours.

The passenger traffic returns have shown remarkable progress:—

In 1850	...	2,096	In 1890	...	97,123
" 1860	...	36,899	" 1910	...	198,569
" 1870	...	35,558	" 1920	...	111,549
" 1880	...	72,787	" 1930	...	253,531

It should be noted that many people are attracted to Dieppe from France or England by its beach and sea-front, its golf course, the green valleys of the country inland and the historical and architectural interest of the locality.

Goods.

A fleet of three twin-screw cargo steamers of 600-ton carrying capacity, in French ownership, effects the daily goods transport in both directions. They make the crossing at a speed of 13 knots.

The mean annual tonnage transported exceeds 45,000 tons, consisting principally of fancy goods, fruit and vegetables. These steamers are also used for the transport of motor cars, whose number exceeds 3,000 a year.

Projected Improvement.

After dealing with the passenger station, the goods station is soon to be modernised. The steam cranes serving both stations are to be replaced by electric cranes.

IV.—Fishing Port

The Port of Dieppe no longer fits out its boats for fishing on the great banks: it specialises in the fresh fish trade. The trawlers, of small and medium size, operate almost entirely in the English Channel: their time at sea is therefore short; many return to harbour every day; some make trips of 36 or 48 hours. They bring in principally the finer varieties of fish native to the Normandy Coast; turbot, brill, bass and soles. These small vessels, marketing their catch quickly, assure a supply in attractive fresh condition.

The fishing industry makes use of the outer basin, excepting the Channel steamer berths, and of the Duquesne docks. It appropriates in all 540 metres of tidal quayage and 550 metres within the impounded area. There is also available, for the repair of fishing craft, a length of 300 metres alongside a timber jetty at the inner end of the Paris Dock, supplied with electric current and with fresh water.

A covered market for the wholesale disposal of fish has been built by the municipality in the Isle of Pollet, near the outer

basin. This building is equipped with all modern conveniences for carrying through the various operations, which are effected under the advisory control of an organisation called the Fishery Service Association and constituted by the ship owners and the wholesale fishmongers in co-operation.

The transport service for the fish traffic has been greatly improved through the ready co-operation of the State Railway Administration. Numerous channels of distribution have been opened of recent years, so that parcels of fish despatched from Dieppe reach not only Paris and neighbouring regions, but other places inland, on the Riviera, in Switzerland, Italy and Spain.

The Dieppe Chamber of Commerce has established a School of Deep-sea Fishing, with the object of training officers—both executive and engineering. During the slack season a preliminary training class for ships' boys has also been held in this school.

The sale of fish has risen in value from 2,000,000 francs in 1913 to 24,000,000 in 1920, 32,000,000 in 1925, 45,000,000 in 1930; but dropped to 43,000,000 in 1935.

Prospects.

By degrees the old steam trawlers are being replaced by modern units, Diesel motor driven. It will be necessary to form bunkering stations to supply such craft with liquid fuel.

There is a project afoot to erect sheds over the surface of the Isle of Pollet; and another to underpin the quays in the Duquesne Dock so as to deepen the berths to zero level.



Unloading Herrings.

V.—Commercial Port

Canada Dock.

The Canada Dock is 150 metres long and 100 metres wide. Cargo vessels of 10,000 tons burden can come alongside the quays. It is accessible at all states of the tide and has two ship's berths.

The India quay receives, from India and the Argentine, oil-seed for use in local manufactories and from this quay oils are exported to England. It is equipped with four 2½-ton travelling portal cranes and a shed of 800 square metres.

The Quebec quay receives grain and nitrates. It is equipped with four 3-ton grab cranes and a shed having an

Port of Dieppe—continued*Passenger and Cargo Steamers of the Dieppe-Newhaven Line in the Outer Harbour.*

area of 3,500 square metres on the ground floor, 2,500 metres on the upper floor and a balcony at first floor level. Near it is another shed having an area of 1,400 square metres.

Paris Dock.

The Paris Dock, 665 metres long and 106 metres wide, provides two quayside berths.

The Morocco wharf furnishes three quayside berths for the trade in fruit—bananas, oranges, lemons, figs and grapes. It is equipped with six $2\frac{1}{2}$ -ton portal cranes with automatic control and two sheds of an area of 3,900 square metres each, covered with roofs of 30-metre span.

Further to the South there has been in service since early in 1936 a reinforced concrete quay, carried on piles and camp-sheeting; a form of construction that is very suitable for basins of moderate depth in soft soil.

Having two ship's berths devoted to the coal trade, this quay is equipped with four 5-ton portal cranes, one travelling $6\frac{1}{2}$ -ton portal crane and a 20-ton portal hopper.

The Norway quay has six quayside berths, appropriated to timber, coal and general cargo—a regular Dieppe-Grimsby service. It is equipped with eight 3-ton portal cranes, a 20-ton portal hopper, twelve cranes from 3 to 5 tons, a shed of 2,200 square metres area and the warehouse of the Paris General Stores with an area of 6,000 square metres.

Railways.

The dock railways have an aggregate length of nearly 50 kilometres, or 30 miles. About half of this total is made up of the two groups of sorting sidings, at Dieppe and Roumesnil-Bouteilles. These are run by the State Railways.

The system is capable of handling the sorting, despatch and clearance of 10,000 tons per day of goods discharged on to the harbour quays.

Special Services.

The Port of Dieppe disposes of four units of ship-repairing plant:—

- (i) A graving dock, having an effective length of 105 metres and a floor width of 18 metres;
- (ii) A floating dock, 60 metres long and $10\frac{1}{2}$ metres wide between pontoon walls, having a lifting capacity of 700 metric tons and able to accommodate ships of $4\frac{1}{2}$ metres draft.
- (iii) A gridiron, having an effective length of 90 metres and a width of 13 metres;
- (iv) A smaller gridiron, 20 metres by 4 metres.

The first of these, owned by the State, is operated by a company on concession; the other three are owned and operated by the Chamber of Commerce.

All the special services that we are now to enumerate very briefly are run by the Chamber of Commerce, viz.:—

- (1) Towage, employing 3 units: Steam tug "Balidar," 600 h.p.; steam tug, "Jean Cousin," 350 h.p.; steam tug "Romulus," 150 h.p.
- (2) Warping vessels through the locks.
- (3) Electric capstans for haulage of wagons while loading and discharging.
- (4) Weighing by small machines and by weighbridges for carts, lorries and wagons.
- (5) Lighting, according to the requirements of various operations.
- (6) Supply of drinking water to ships.
- (7) Disinfection by sulphurous-anhydride process.
- (8) Storage of goods.
- (9) Fire prevention.
- (10) Watching.

ANALYSIS OF TRADE

Class of Goods	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Imports	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Coal	216,000	337,000	287,000	379,000	396,000	372,000	354,000	365,000	321,000	286,000
Oil Seed	78,000	71,000	91,000	88,000	93,000	90,000	90,000	97,000	72,000	79,000
Bananas	22,000	27,000	46,000	47,000	74,000	84,000	89,000	71,000	47,000	28,000
Timber	22,000	21,000	22,000	26,000	25,000	12,000	13,000	10,000	9,000	4,000
Miscellaneous	34,000	32,000	32,000	68,000	71,000	87,000	52,000	50,000	46,000	44,000
Total of Imports ...	372,000	485,000	478,000	608,000	659,000	645,000	598,000	593,000	495,000	441,000
Exports										
Straw	—	—	—	21,000	22,000	25,000	21,000	18,000	6,000	7,000
Shingle	11,000	14,000	11,000	6,000	5,000	5,000	4,000	3,000	3,000	5,000
Miscellaneous	71,000	66,000	62,000	53,000	47,000	39,000	159,000	147,000	166,000	166,000
Total of Exports ...	82,000	80,000	73,000	80,000	74,000	69,000	184,000	168,000	175,000	178,000
Grand Total	454,000	568,000	551,000	688,000	733,000	714,000	782,000	761,000	670,000	619,000

Port of Dieppe—continued

VI.—Research

Wave Action.

Dieppe, being the port nearest to Paris, opening on to the English Channel and exposed to its severe storms from the North-West, was chosen as the site or "laboratory" where the French share of the experiments on wave pressure could most suitably be made.

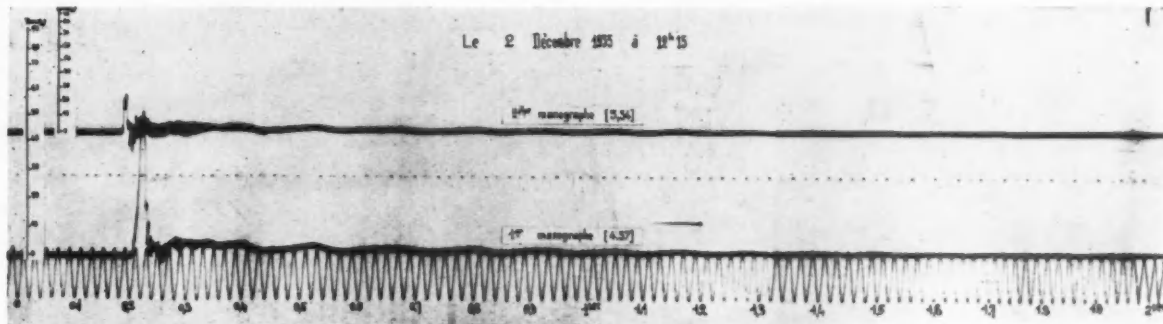
Experiments undertaken in 1927, by request of the International Navigation Congress at Cairo, were carried through and enabled France to present to the Congress at Venice in

with an oscillograph to record the variations in wave pressure at any height.

(ii) At the old pierhead of the West Jetty:

Three pressure gauges, as above described, which for the first time record pressures experienced during the actual impact of waves.

Cinema films have disclosed a speed of 60 metres per second in breaking waves, which was previously unknown, and the records of pressure at the base of the breakwater have exceeded the astonishing magnitude of 50 tons per square metre;



Diagrams of Wave Impact.

1931, the resulting data in the form of charts showing actual recorded wave pressures, before any other country had yet reached comparable results.

At Brussels, in 1935, Dieppe gave in addition the first precise diagrams recording variations in surface level.

The items of apparatus in use at the present time are:—

- (i) At the extremity of the West Jetty:
 - (a) An electrical instrument for recording variations in surface level in relation to time.
 - (b) A recording pressure gauge, with hydraulic transmitting gear, made in Dieppe.
 - (c) A pressure gauge, on the quartz-piezo-electric principle, mounted on a panel, sliding from the sea bed up to the parapet of the West Jetty and connected

the maximum force of the blow being often reached in less than one-hundredth of a second.

Observations are to be made later, upon the pressures exerted on the material of the breakwater itself, by means of an apparatus working on the principle of variation of induction, and now being fitted up.

As a city whose people are hardy seafarers and men of commerce, as a deep-water port on a coast otherwise inhospitable, as a stage on the route from Paris to London, a healthy centre lying between a sea teeming with fish and a fertile countryside; Dieppe may justly be proud of her glorious past and, having borne the strain of the world-wide economic depression without serious decline, can look forward with confident hope to whatever the future may hold in store.

JETTY EXTENSION—LONDON



THE ABOVE ILLUSTRATION SHOWS THE EXTENSION TO THE JETTY AT BARKING POWER STATION, CONSTRUCTED BY US.

PETER LIND & CO. LTD.

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News from all Quarters

Hong Kong and Singapore

SHIPPING returns from the Port of Hong Kong show a decline in tonnage entered and cleared in the third quarter of 1936, compared with the second, and the value of the traffic has correspondingly declined. In part this is a seasonal movement, but it also reflects the disturbed political conditions which prevailed in Southern China. The national shares in the import traffic are shown in the following table:—

	TONNAGE ENTERED	
	July-Sept.	April-June
British	2,244,883	2,427,242
Japanese	712,504	720,303
American	363,532	345,642
Chinese	308,392	376,108
Dutch	237,590	217,136
Norwegian	220,668	242,954
German	173,890	192,816
French	132,695	180,134
Other Nationalities	404,011	543,664
	4,798,165	5,245,999

At Singapore, however, traffic has been much the same, tonnage entered being 3,962,184, compared with 3,970,643 in the previous quarter, while clearances amounted to 3,964,372 tons, compared with 3,967,146. Nationalities of shipping entered were as follows:—

	TONNAGE ENTERED	
	July-Sept.	April-June
British	1,178,026	1,204,456
Dutch	848,857	841,048
Japanese	644,161	682,678
Norwegian	250,000	217,599
German	230,927	227,959
French	211,194	225,252
Other Nationalities	358,573	317,629
	3,721,808	3,716,621

Russia

The importance of Leningrad, the expansion of foreign trade, and the rapid development by the Soviet Government of Murmansk and the White Sea ports, is clearly shown in the figures for the first nine months of 1936.

	Imports Jan.-Sept.		Exports Jan.-Sept.	
	1935 Tons	1936 Rouble	1935 Tons	1936 Rouble
Leningrad ...	309,895	82,614	252,932	106,799
Murmansk ...	65,006	21,345	94,111	30,897
White Sea Ports ...	1,947	620	4,353	1,512
		60.02%		62.09%
Leningrad ...	2,600,215	66,713	2,649,457	66,676
Murmansk ...	412,977	18,073	475,654	11,122
White Sea Ports ...	1,799,675	24,644	2,009,888	30,265
		42.43%		48.39%

Leningrad handled 29.86 per cent. (by value) of exports and 47.64 per cent. of imports, but the interesting feature is undoubtedly the rapid development of the White Sea region, and of the Port of Archangel, despite the disadvantages of being ice-bound for seven months. Murmansk has developed partly as a result of the coal trade from Spitzbergen, where a Dutch concern is exploiting a concession, partly by developing an export trade as a result of the more intensive working of the apatite deposits near Chibinogorsk, but mainly because of the increased import of machinery, etc., in connection with construction of the White Sea Canal and the planned industrialisation of the region.

The timber trade from the White Sea ports, and particularly the trade in sawn timber from Archangel, is expected to develop rapidly, now that scientific forestry is replacing the wasteful exploitation of the country's timber resources, which was necessary to pay for the heavy imports of machinery necessitated by the five-year plan. The hinterland of Archangel is to be developed and sawmills, cellulose factories and other timber manufactures are projected. As a consequence, a new telephone system is being installed in the port, connecting the central office with all the wharves and warehouses. This, when completed, should greatly facilitate the control of loading operations. It will be interesting to see how far the Soviet succeed in overcoming the natural obstacles to the development of a prosperous port. So far, the Arctic route has been very successful. Observation stations all along the coast and reconnaissance aerodromes at suitable points have allowed the working of this seaway without detaining any ships in the ice. Whether it will be an economic proposition remains to be seen.

One of the most progressive ports in the U.S.S.R. is Batoum. Of course, it chiefly ships petroleum, and the petroleum mole, 959 metres long, has berths for five ships, and room at the head for fueling ships. Petroleum pipes serve most of the wharves, so saving time in bunkering, and all berths have running water and are lit by electricity from the town mains. Loading of petroleum is entirely automatic, and the port has much modern equipment, including a floating crane with a capacity of 100 tons, and another of 8 tons, two steam-driven portal cranes with a capacity of 45 tons, several electrical transporters and electrically-propelled trolleys for handling goods on the quays and in the warehouses. Apart from the petroleum traffic and a growing trade in Caucasian products, the port has a considerable transit trade with Iran.

Canada

The recently constituted International Joint Commission of the United States and Canada began its business in November by consulting New York business interests on the possibilities of the proposed international canal from New York to Montreal up the Hudson Valley and through Lake George and Lake Champlain. The commission will hold sittings in Montreal, Albany and various towns in the Eastern United States to investigate the feasibility of the project.

Opinion at the present moment is very divided. On the one hand, the proposed canal would shorten the distance between Montreal and New York by 1,200 nautical miles, and would save about 3½ days on voyages to Southern ports, representing a reduction of cost for the average ships of about 3,040 dollars each way. This means a saving of about 50 per cent. on existing railway charges, or a total reduction of freight costs by about 100 million dollars a year. It would also be a great benefit to the Port of Montreal during the few months when navigation on the St. Lawrence is obstructed by ice.

On the other hand, it is pointed out that the capital cost will be very heavy (150 to 200 million dollars) and the profitability of the scheme is by no means assured. Moreover, if it were successful, it means the obsolescence of the existing transport system, and would possibly involve leaving many towns and ports derelict, which is a heavy social cost hardly justified by the anticipated saving.

Eritrea

The Italian Government are going to spend over £950,000 on developing the Port of Assab. The conquest of Abyssinia has given new importance to this region. A road is now under construction, which will connect the port with Dessie, so creating a hinterland, and it is hoped to develop Southern Eritrea, while the possibilities of developing a considerable trade with Arabia north-eastwards are considered favourable. The work will be taken in hand at once, so that Italian foothold in Northern Abyssinia will not depend entirely on the Jibuti railway.

Egypt

In the first ten months of 1936, 2,081 cargo ships with an aggregate of 4.83 million n.r.t. were cleared from the Port of Alexandria, compared with 2,026 ships of 5.01 million n.r.t. in the corresponding period in 1935. The principal flags represented were: Great Britain (1,253,861 tons), Italy (838,790), France (564,352), and the United States (459,659). Coal was the principal cargo carried.

Sweden

Harbour facilities at Gothenburg are to be improved during 1937 at an estimated cost of 2.25 million Kroner (about £125,000). A new quay, 285 metres long, with a water depth of eight metres, is to be built on the East side of the existing Lindholmshamnen. A new roadway, 25 metres wide, and three new railway tracks will serve the basin so formed, and it is proposed to build two new warehouses on the quayside.

Norway

The Oslo Harbour Authority has decided to improve the harbour facilities on account of the rapid increase in traffic. Accordingly, they have invited tenders for five large cranes, and have decided to erect several new warehouses.

Poland

In November the amount of traffic handled by the Port of Gdynia was about the same as in the previous month, but the volume of shipping entering had risen from 417,000 n.r.t. to 450,000 n.r.t. Polish ships predominated, and were followed by German, Danish, Norwegian, British and American in that order of importance.

Port of Southampton Topics

Docks Statistics for November.

SOUTHAMPTON Docks statistics for November are a curious mixture. The number of ships, tonnage of cargo and volume of passenger traffic are revealed as greater than in November, 1935, yet both gross and net tonnage totals show a substantial decrease.

The number of vessels inward was 221, as compared with 210, and outward 213 as against 210, giving increases of 11 and three respectively.

Despite this, the gross tonnage inward was 44,417 tons less, the total for the month being 1,268,798 tons, as against 1,313,215 tons in November last year.

Outward there was an even bigger margin, for the figure in that instance was 1,154,401 tons, compared with 1,301,556 tons a year ago, a decrease of 147,155 tons.

The net tonnage inward decreased by 28,017 tons, and the net tonnage outward by 101,344 tons. The figures were: inward 688,017 tons, as against 716,034 tons a year ago, and outward 617,980 tons, as against 719,324 tons.

The volume of cargo dealt with showed an astonishing increase, for despite the fact that exports dropped by 8,358 tons (the figure being 34,040 tons in comparison with 42,398 tons) imports mounted from 51,202 tons in November, 1935, to 76,166 tons, an advance of 24,964 tons.

Passenger traffic also improved substantially. Arrivals numbered 7,728, whereas in November of last year they were only 6,050. Departures were 10,127, compared with 9,882. The respective increases were, therefore, 1,678 in passengers inward and 245 outward.

Shipping at Southampton.

December has been a month of many interesting happenings in Southampton Dockland.

Two new ships have made their maiden departures from the docks, and the two largest liners in the world, the "Normandie" and the "Queen Mary," brought to an end successful seasons before undergoing annual overhaul.

On December 5th, the Union Castle Line's new motor-ship, "Walmer Castle," began her maiden voyage in the the Continental trade between Southampton, Bremen and Hamburg. Having the necessary speed, she will accomplish what has previously been done by two ships, the "Eider" and the "Hansa." The "Eider" is to be sold, and the "Hansa" will be laid up for use in emergency.

The other vessel on her maiden voyage was the German African Lines, "Pretoria," which called at Southampton while on her first trip to the Cape. She will be followed early in 1937 by a sister craft, the "Windhuk."

On December 21st the "Queen Mary" completed her first season in the North Atlantic passenger trade. She will now be out of service for six weeks undergoing overhaul. The great liner has not only won golden opinions from everyone, but has recaptured for Britain the Atlantic Blue Riband which the German liner "Bremen" wrested from the "Mauretania" in 1929, so that her first season has been memorable.

Ten days after the "Queen Mary," the giant French liner "Normandie" called to disembark passengers from New York and then went on to Havre, where she will lay up for annual overhaul.

Another event worthy of mention was the sailing of the Lamport and Holt liner "Vandyck" for Madeira on a Christmas cruise on December 23rd, for this sailing inaugurated a fortnightly service, which will be maintained between Southampton and Madeira until the late spring.

While the list of sailings and arrivals of big ships was about the same in December as in the corresponding month of 1935, there was a definite increase in traffic with New York. There were 16 arrivals from and 28 departures for New York, which figures were higher than those in the corresponding month in the past three years.

Southampton's Passenger Traffic.

Southampton's reputation as a passenger port has been immeasurably increased in the past year or two as a result of the popularity of pleasure cruising. Southampton is No. 1 port for cruises as well as for ocean passenger traffic.

This is highly gratifying, for apart from the fact that passengers increase, so also does the tonnage upon which dues are paid to the Southern Railway Company as owners of the docks, and to Southampton Harbour Board as guardians of the waterway.

The year 1936 saw all cruising records broken so far as Southampton was concerned. The coming year is likely to see the number of cruises based on Southampton even greater than those in 1936. Apart from dozens of round voyages which are advertised, and to a degree are regarded in the same light as pleasure cruises, there are 85 pleasure trips already arranged to start from British ports, and, of these 85, no fewer than 42 are based on Southampton. The majority are arranged for the summer, but there are some in every month of the year except November.

Meeting of Southampton Harbour Board.

At the December meeting of Southampton Harbour Board it was announced that the Board's dredging programme was now completed. The cost of the scheme had been £300,000.

The Chairman of the Works and Harbour Committee (Sir Sidney Kimber) stated that at the moment they had no further dredging in view. It was a long time since they had been able to say that, and he hoped it would be a long time before they would have to go to further expense for dredging, although there would be the ordinary cleaning up from time to time.

Sir Sidney expressed the hope that the Board had now done all the shipping companies desired, all the pilots wished for, and that they had made things as easy as possible for getting big ships and little ships into the port.

He added that it would be about four years before the Board had finished paying for the dredging that had been done.

New Sheds at Southampton.

During recent years the new dock facilities at Southampton have been the focus of so much attention that improvements which have been made in other directions have tended to be overshadowed.

At the Empress Dock new sheds are practically complete, having a floor space in excess of 55,000 sq. ft.

These sheds replace those which were destroyed by fire some time ago and are built in two spans, the width in both instances being 59 ft. 6 ins., whilst the length of one section is 409 ft. 6 ins. and 516 ft. 9 ins. in the case of the other. The whole of the structure is covered with galvanised corrugated iron sheeting.

A. & J. Main and Co., Ltd., Vincent House, Westminster, London, S.W.1, and whose works are at Glasgow, have been entirely responsible for the design and erection of the structure, which is of the knee-brace type.

The new sheds bear the numbers 24 and 25.



Part of the New Dock Sheds at Southampton which have been constructed and erected by A. & J. Main, Ltd.

Notes from the North

Isle of Man Harbour Board.

ISLE OF MAN Harbour Board has decided to install a more powerful type of whistle at the Victoria Pier, to increase the efficiency of the fog signal on Douglas Head, and also to install a wireless beacon at the Victoria Pier, Douglas. Experiments with another type of horn were carried out at the Victoria Pier a few weeks ago. An important decision is to operate the horn throughout the period of fog, and not simply when passenger vessels are expected. The wireless transmitter beacon will be of the Marconi type T.W. 15, and will employ medium wavelengths, with a range of from 25 to 30 miles, enabling vessels equipped with the proper receiver to obtain directional assistance. At Douglas Head there is now a reed signal, which it is intended to replace by something more modern and efficient. The Northern Lights Commissioners have undertaken these arrangements. This plant also will be provided in duplicate.

Damaged Breakwater.

Work is at present in progress on the butt of the damaged breakwater at Port Erin. It is now proposed to extend the work to provide a landing place for fishing boats and yachts. A deputation of the Town Commissioners is to discuss the matter with the Harbour Board. The breakwater was constructed over 60 years ago by the Imperial Government at a cost of about £80,000. Its length was 950 ft., and it was formed of huge concrete blocks, weighing from 14 to 17 tons each, resting irregularly upon an artificial mound of rubble. For the convenience of loading and unloading ships, a concrete low-water landing pier, 310 ft. long, was constructed on to the breakwater, a short distance from the quay and parallel to it. The works were smashed and washed away by a storm, and the ruins of the breakwater are the only protection of Port Erin Bay. The cost of reconstructing the breakwater, it is feared, will be heavy, but the Commissioners are of opinion that the work is necessary. A new breakwater would certainly be a great asset to Port Erin, and many people have visions of the development of Port Erin as a harbour, and see the time when ships from Ireland disembark passengers there instead of going round to Douglas.

Caernarvon Harbour Trust.

Caernarvon Harbour Trust has accepted the tender of Messrs. W. J. Yarrow (Northwich) to supply a hopper-dredger and combined utility steamer for £7,874. Mr. J. G. Wynn Williams (chairman of the Finance Committee of the Trust) states the tender recommended, though the lowest, was nearly £1,000 above the sum anticipated by the Trust. The Committee is, however, convinced that there is no alternative in view of the accumulation of mud in the dock, and the impossibility of keeping pace with it by hand labour.

Port Charges.

Port charges were discussed by Mr. L. W. Grinling, of Coast Lines, Ltd., at the last meeting of the Liverpool Branch of the Industrial Transport Association.

He explained that the revenue expended by the Mersey Docks and Harbour Board was obtained from ship owners and merchants, whose respective contributions were fairly evenly balanced. As a principle, the Board assessed the amount of dues on things coming into the port on their value. The most valuable had to pay rates which were in the highest category and inversely those which were of the least value were let off rather lightly. That principle could be discerned throughout the dues book of the Mersey Docks and Harbour Board.

Although in Liverpool, ship owners had always stood for the principle of free trade, there was in the Dock Board dues a slight form of protection because the outward cargo dues were lower than those on goods coming inwards.

Mr. Grinling quoted the dues charged on certain classes of cargo to Liverpool in comparison with those to other ports, principally London and Bristol, which received consignments of the same goods in approximately equal quantities. Dried fruits, including currants and dates, were charged in Liverpool at 5s. 4d. per ton, less five per cent., but in London currants and dried fruits were generally only 2s., and dates, which were given a separate classification, cost only 1s. In Bristol, dried fruit was charged at 3s. 6d. Canned fruits, canned fish, canned meat, etc.:—Liverpool 6s., less five per cent.; London, 2s.; Bristol, 3s. (In Liverpool the dues were payable on the net weight of the cargo only, whereas in London and Bristol they were payable on the gross weight). Bacon and hams:—Liverpool, 3s. 6d.; London, 2s.; Bristol, 2s. 6d. Cocoa:—Liverpool, 3s. 6d.; London, 1s.; Bristol, 3s. Tanning materials, divi divi:—Liverpool, 3s.; London,

1s.; Bristol, 2s. 6d. Myrabolams:—Liverpool, 3s.; London, 4d.; Bristol, 2s. Valonia:—Liverpool, 3s. 8d.; London, 6d.; Bristol, 1s. 4d. Dry hides:—Liverpool, 6s. 10d.; London, 1s.; Bristol, 3s. 6d. In each case these figures had to be considered in relation to the value of the services rendered. Figures at every port varied considerably, but there remained plenty of scope for co-ordination to put rates on a more equitable basis. In Newcastle the port authority charged on canned fish only 4d. a ton, whilst the rate for canned meat was 10d. and canned fruit 1s.

Referring to the Port of London overside delivery, the origin of this, he explained. At one time, before there were any docks in the Thames, watermen ran their boats alongside ships and took their cargoes ashore. When docks were provided the Thames watermen were able to get clauses inserted in the statutory powers enabling anyone to demand overside delivery. A large quantity of traffic imported into London was put into lighters and taken to one of the waterside wharfs and dealt with there. Shippers could not get overside delivery in Liverpool, where, of course, port conditions were entirely different. Perhaps in London the actual cost of dealing with cargoes was far more to the shipowner than in Liverpool.

In Southampton there was a most extraordinary condition. The port authority levied their charges not on the weight of traffic, but according to whether the shipowner charged out traffic on weight or measurement basis. That, however, did not apply to traffic brought in by rail.

The Penny Bridge.

It is expected that the "Penny Bridge," Poulton, will be made toll-free to traffic by the time of the Coronation. Meanwhile, Birkenhead Town Council has invited representatives of the Wallasey Corporation to confer with the Roads Committee on the consideration of tenders for the reconstruction of the Wallasey Bridge Road.

Manchester Ship Canal.

Manchester Ship Canal Company's traffic receipts for November were £92,433, against £113,532 for October, and against £105,768 for November last year, making a fall of £13,335, as compared with a year previously. The decline, however, reduces the total increase in receipts for the eleven months ended November, as compared with last year, to £15,172.

For the first six months of this year the receipts were £25,521 more than in the corresponding period of 1935, and net revenue was £6,780 more. In view of the less satisfactory increases in traffics in more recent months, however, it seems possible that net revenue for the whole year may show a little improvement, as compared with last year.

Maryport Harbour.

Sir George Gillett, the new Commissioner for Special Areas, who has been touring Cumberland, announces that he is taking up the recommendations of his predecessor, Mr. Malcolm Stewart, in regard to the improvement of Maryport Harbour. After visiting the Maryport docks and harbour, Sir George said that unless something was done the port would soon be useless. He was conducted round the port by Captain Allman, the Harbour Commissioners' clerk.

"I am not an expert on harbour matters," he said, "but it is perfectly obvious that unless something is done soon, the port will be useless. My predecessor made a recommendation that it is a well-laid-out port, worth reconditioning and retaining as a national asset. I agree with the line he has taken in the matter. It is, of course, a decision and a job for the Government." Sir George said he understood that the minimum figure required for reconditioning would be about £70,000, but the cost depended greatly upon the extent of the work of repair and renewal undertaken.

The Port of Copenhagen.

The number of ships which entered the Port of Copenhagen during November, 1936, was:—From inland ports 1,174 steam and motor-ships of 185,142 n.r.t., and 31 sailing vessels of 6,576 n.r.t. arrived. Shipping arriving from foreign ports amounted to 759 steam and motor-ships of 421,180 n.r.t., and 14 sailing vessels of 5,805 n.r.t. The total of steam and motor-ships and sailing vessels arriving from both inland and foreign ports for November, 1936, amounted to 1,978 vessels of 618,703 n.r.t.

The Institution of Civil Engineers

Mr. Carpmael on "The Maintenance of Waterways to Harbours and Docks" The Important Work of the Harbour Engineer

Mr. Raymond Carpmael, O.B.E., M.Inst.C.E., Chief Engineer of the Great Western Railway, in his Paper read before The Institution of Civil Engineers on Tuesday, 8th December, 1936, said that the majority of the main engineering problems in connection with harbours and docks were due, in a greater or lesser measure, to water-action. All over the world unceasing changes were taking place in the seaboard or land-frontages to the sea, due either to the sea encroaching on the land, or to land being formed by the deposition of materials from the sea. He said that one of the best examples of materials being deposited from the sea was seen at Dungeness, projecting some seven miles beyond the general line of the Kentish coast, where pebbles from Budleigh Salterton, near Exmouth, as well as Cornish pebbles, had been picked up. Wherever the harbour engineer created a harbour in tidal waters, thereby causing interference with littoral drift, he had sooner or later to take steps to preserve the necessary depth of water for the safe navigation of the type of ship for which the harbour was designed.

Mr. Carpmael quoted various examples of the results obtained when no action had been taken, such as at Ceara Harbour on the north-east coast of Brazil, where after spending over £400,000, the harbour was now completely overwhelmed by sand, with the exception of a small area where a shallow berth was maintained by dredging; and at St. Catherine's, Jersey, where the harbour was now sanded up and abandoned, with the total loss of the £200,000 spent on it.

He pointed out that a large proportion of the harbours of Great Britain had been built at the mouths of rivers which brought down large quantities of alluvial matter eroded from the land and that formed bars at or near the mouths. Before dealing more particularly with the problems confronting the Great Western Railway in maintaining navigable depths in their Bristol Channel ports, he pointed out that the methods employed to maintain waterways could be considered under two headings:—

- (1) Maintenance by artificial works, such as training walls, etc., to arrest and divert the travel of sand and shingle.
- (2) Physical removal by dredging or sluicing of accumulations due either to river or sea action.

Often it was possible, by providing suitable protective constructional works, to avoid heavy dredging costs, and, as an example, Mr. Carpmael referred to the Queen Alexandra Dock at Cardiff, where groynes had been built of fascines to arrest erosion, and, at the same time, the accreted spit in front of the opposite bank had been dredged away to lead the river-discharge in a direction parallel to the main entrance channel.

He gave a short historical survey of dredging craft, and said that the progenitor of the bucket dredger was the Persian "chain of pots" used for raising water from wells; that consisted of an endless rope or pair of ropes made of palm fibre, to which were attached earthenware pots at uniform intervals. References to the "chain of pots" were found as far back as in an account by the historian Pliny and also in the Bible. A modification of the "chain of pots" was the Chinese "chain" pump mentioned in Chinese literature in A.D. 1145, in which the earthenware pots were replaced by flat square pieces of wood. A very modern and efficient French pump was based on that model, but consisted of an endless spiral rotated at speed, the spiral performing the dual function of chain and buckets.

The first steam ladder-dredger used in Great Britain was Sir Samuel Bentham's model made in 1800, whilst sluicing could be said to originate from the methods employed by the Venetians in the 14th century for the removal of bars or deposits of silt in harbours, when on ebb tides, these were stirred and scraped with iron harrows attached to long wooden handles, operated by men in small boats. That method was also employed many years ago at Great Grimsby and on the Humber, and a somewhat similar arrangement was in use today in the Great Western Railway Company's dock at Bridgewater.

Mr. Carpmael said that modern dredgers were of four types:

- (1) Sand-pumps and drag-suction dredgers.
- (2) Bucket or ladder.
- (3) Dipper or spoon.
- (4) Grab.

A typical example of the sand-pump was that owned by the Mersey Dock and Harbour Board, which was capable of dealing with some 120,000 cubic yards a day of 10 hours, working

in a depth of 70 ft., whilst drag-suction dredgers had been employed in connection with the construction of the Buenos Aires Harbour. Bucket and ladder-dredgers could either be self-filling or non-self-filling, self-propelled, or dumb (incapable of self-propulsion). On purely economic grounds, the case for the dumb dredger was strong, the additional running an overhead costs consequent upon the provision of an independent set of engines for propulsion amounting to 15 per cent. Dipper or spoon dredgers had been used in the Culebra Cut of the Panama Canal, and some were capable of not only lifting lumps of rock some 50 tons in weight, but of actually digging to a depth of about 50 ft. in soft unblasted rock—at the rate of from 7,000 to 10,000 tons per 24 hours—according to the hardness of the material encountered. Grab dredgers had given excellent results at many large docks, and one employed at Buffalo, U.S.A., had a 10-cubic yard bucket operated by pneumatic power with an output of 600 cubic yards an hour, working in a depth of 65 ft.

Mr. Carpmael said that the Great Western Railway Company, the largest private dock-owning corporation in the world, dredged on an average over 1,000,000 tons in its docks, and over 4,000,000 tons in the channels leading to the docks, annually. That represented an expenditure of a capital sum for dredging plant of nearly £500,000, with an average yearly cost of some £60,000 for operation, including ordinary running repairs. The problems encountered in the Bristol Channel ports were of many kinds, especially as the tidal range was very considerable, varying from 40 ft. at ordinary spring tides at Newport to 26.80 ft. at Swansea, with maximum recorded ranges at those ports of 45.30 ft. and 32.40 ft. respectively. The main factors influencing dredging costs were:—

- (1) An appropriate distribution and economic use of the draft.
- (2) Time losses due to weather.
- (3) The exigencies of traffic.

The periods in commission (periods during which actual loading was going on) varied for different classes of dredging, and was said to vary for bucket dredgers from 58.6 per cent. to 66.9 per cent. of the overall time. Detailed records were kept of the work of the bucket dredgers, grab dredgers and steam-hopper barges so that the best use could be made of them.

Messrs. Wm. Simons & Co., Ltd.

During the year 1936, Wm. Simons & Co., Ltd., Renfrew, have constructed the following:—

Vessels Constructed		Gross Tonnage	I.H.P.	Owners
Booster Station	2,500	Colonial
Non-propelling Bucket Dredger	...	465	600	British

Besides the above, a large quantity of dredging machinery was also constructed during the year.

The Port of Rotterdam.

The Chamber of Commerce and Industry of Rotterdam has issued the statistics concerning the movement of sea-going ships in the New Waterway, and which are as follows:— During November, 1936, 1,110 ships of 1,801,572 n.r.t. entered the Port of Rotterdam, as compared with 997 ships of 1,618,402 n.r.t. during November, 1935. The number of ships entering for the small ports in the environs were 217 of 459,182 n.r.t., as compared with 198 ships of 418,828 n.r.t. in November, 1935.

For the eleven months, January-November, 1936, 11,441 ships of 18,636,088 n.r.t. entered the Port of Rotterdam, as compared with 10,102 ships of 16,359,240 n.r.t. in the corresponding period of 1935. The number of ships entering for the small ports in the environs of Rotterdam during the period, January-November, 1936, were 2,258 of 4,482,585 n.r.t., as compared with 2,168 ships of 4,345,918 n.r.t. in the corresponding period of 1935.

After deducting the number of ships counted more than once in the different ports, the number of entrances in November, 1936, were 1,254 ships of 2,013,222 n.r.t., as compared with 1,138 ships of 1,868,917 n.r.t. in November, 1935. For the eleven months, January-November, 1936, the total entrances were 12,941 ships of 21,053,217 n.r.t., as compared with 11,644 ships of 19,018,552 n.r.t. in the corresponding period of 1935. These figures are for the whole region of the Port of Rotterdam with its environs, comprising the delta formed by the mouths of the Rivers Rhine and Meuse.

North-East Coast Notes

Suggested Wireless Beacon for the Tyne.

A MOST interesting proposal was before the November meeting of the Tyne Improvement Commission. It was that a long-range wireless beacon should be installed on the North Pier Tyne breakwater, and although the matter was not advanced very far, it does not seem probable that it will be allowed to drop. The question was raised before the Piers and Harbour and Ferry Committees so far back as July, following which Mr. Albert Blacklock, the Secretary of the Commission, had some correspondence with London Trinity House and the Chamber of Shipping seeking an expression of their views. In his letter to the former, Mr. Blacklock said one of the principal points that had arisen was whether it would be of greater advantage to shipping destined for the Tyne to have wireless beacons installed at say, Souter Point and at another point north of the Tyne entrance instead of a beacon at the Tyne entrance. In his reply, the Secretary to the Trinity House said "The Elder Brethren are of opinion that a radio beacon of about 50 miles' range established actually at the Tyne entrance would be of most assistance to the mariner as it would give a direct lead into the river and it could also be used in conjunction with other long-range beacons which are under contemplation for establishment on that part of the coast for the purpose of obtaining cross-bearings. I am to add that should the Commissioners desire to proceed with the scheme the proposal should in the first instance be submitted to the Board of Trade for consideration by the Wireless Direction Finding Committee." In reply to a further letter from Mr. Blacklock inquiring as to the location of the contemplated long-range beacons, the Secretary of the Trinity House replied that "arrangements are already in hand to provide a radio beacon at Flambro Light House, and it seems likely that there may be a demand for a radio beacon in the vicinity of the Longstone Light House before long." The Secretary of the Tyne Commission informed the meeting that he had been advised by the Chamber of Shipping that they were not yet in a position to furnish their views on the proposal.

In the end it was decided to defer further consideration until after receipt of the views of the Chamber of Shipping.

Trade and Finance.

At the monthly meeting of the Tyne Improvement Commission in November, the Docks and Trade Committee reported that in the past ten months shipments of coal and coke from the Tyne totalled 11,014,055 tons, a decrease of 58,319 tons compared with last year. Bunker shipments at 1,070,375 tons were 47,888 tons lower. October had been a good month for shipments, and showed an increase of 54,159 tons. Whilst coal exports were down by 495,000 tons—trade to Italy showed a falling off of 880,000 tons—coastwise shipments were up by 437,000 tons. There had been substantial increases to Germany, Scandinavia, Finland, Holland, West Africa and the West Indies, which had largely made up for the loss of trade with Italy.

Mr. H. P. Everett said the revenue of the port for the ten months was £14,000 higher than in the corresponding period of last year.

The Chairman, Sir Arthur Sutherland, announced that tenders had been accepted for the new berth at Albert Dock entrance for the Fred Olsen Line. It was decided to go on with the construction of a timber quay with a depth of 25 feet alongside the levelled site belonging to the Commissioners at Hebburn. The Commissioner for Special areas had approved a grant in aid of 100 per cent. for the clearance, and 33½ for the development.

Record Making at Blyth.

A new record for a week's shipment of coal from Blyth was established in the last week of November. Between them the London and North-Eastern Railway Co. and Cowpen Staiths accounted for 155,660 tons, the previous best total being 155,481 tons in the week ending on December 21st last year. Writing before the figures for 1936 were available, prospects were good, and a total of about 6,750,000 tons was anticipated. The latest official figures available were those for the ten months to the end of October. They were 5,608,355 tons, compared with 5,250,811 tons in the like period of 1935, and 4,645,465 tons in 1929. These totals show an increase of 7 per cent. on 1935, and 21 per cent. on 1929.

Sunderland Changes.

Notable developments were approved at the November meeting of the River Wear Commission. On the recommendation of the General Purposes Committee it was agreed to lease an area of 1,240 square yards of the barracks site together with the sites of three houses in North Moor Street, to the Sunderland Corporation for an extension of the oil installation at the Corporation Quay at an annual rent of £60. It was also agreed to let an additional 650 square yards immediately adjoining the saw-mill at the South Docks to Messrs. W. and C. Robson. This will involve an alteration of the railway lines at a cost of about £300, but in view of Messrs. Robson's increased imports and the proposed rental, the Committee recommended that the Commissioners defray this expenditure.

It is reported that the River Wear Commissioners have acquired the Bridge Dock, Sunderland. This was formerly part of Robert Thompson and Co's ship-repairing establishment, and the site is to be used in connection with the river widening though it is not yet known when the work will start.

The coal and coke shipments for the ten months totalled 3,337,572 tons, an increase on the figures for the like period of 1935 of 198,269 tons. Other exports for the ten months totalled 39,090 tons against 33,352 tons in the corresponding period of 1935. The items were machinery, 8,716 tons; pitch and tar, 4,590 tons; petroleum, 16,117 tons; and sundries, 7,955 tons. Imports for the ten months totalled 263,226 tons, against 288,674 tons in the same period of last year, these included timber and props, 78,348 loads; grain, 12,188 tons; esparto, 20,838 tons; iron ore, 34,989 tons; cement, 15,571 tons; petroleum, 63,450 tons; wood pulp, 5,276 tons; iron and steel, 3,057 tons; sundries, 29,506 tons.

Port of London Notes

London Shipping.

During the week ended November 27th, 1,038 vessels, representing 1,026,546 net register tons, used the Port of London. Of these, 470 vessels (795,684 net register tons) were to and from Empire and foreign ports, and 568 vessels (230,862 net register ton) were engaged in coastwise traffic.

During the week ended December 4th, 1,261 vessels, representing 1,079,631 net register tons, used the Port of London. Of these, 503 vessels (834,552 net register tons) were to and from Empire and foreign ports, and 758 vessels (245,079 net register tons) were engaged in coastwise traffic.

During the week ended December 11th, 1,239 vessels, representing 1,041,474 net register tons, used the Port of London. Of these, 514 vessels (795,217 net register tons) were to and from Empire and foreign ports, and 725 vessels (246,257 net register tons) were engaged in coastwise traffic.

During the week ended December 18th, 1,030 vessels, representing 1,030,619 net register tons, used the Port of London. Of these, 495 vessels (793,182 net register tons) were to and from Empire and foreign ports, and 535 vessels (237,437 net register tons) were engaged in coastwise traffic.

During the week ended December 24th, 892 vessels representing 1,011,044 net register tons, used the Port of London. Of these, 474 vessels (820,857 net register tons) were to and from Empire and foreign ports, and 418 vessels (190,187 net register tons) were engaged in coastwise traffic.

Tilbury Passenger Landing Stage.

Thirty-two vessels totalling 279,904 tons gross register used the Tilbury Passenger Landing Stage during the month of November.

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